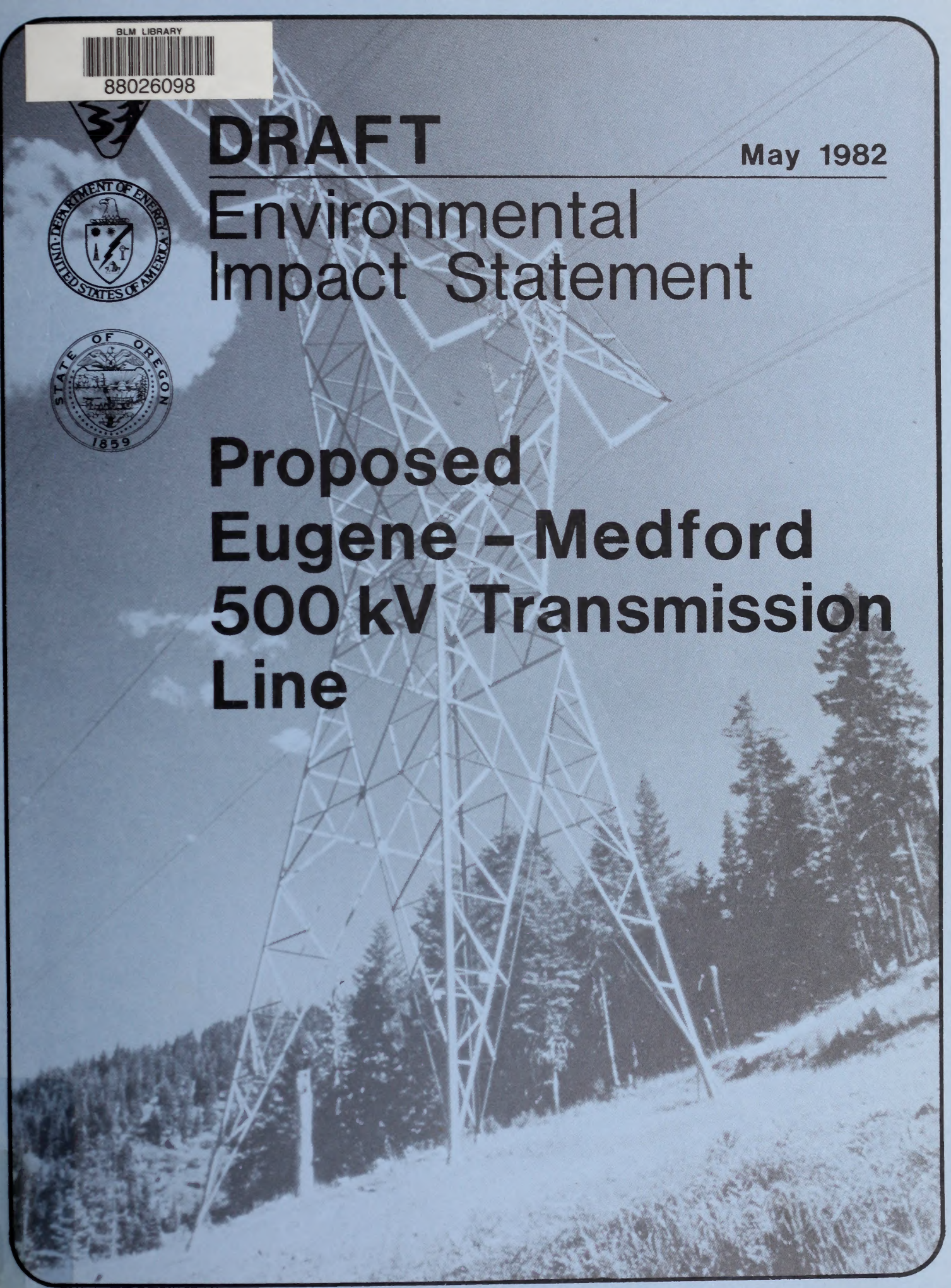
DRAFT

May 1982

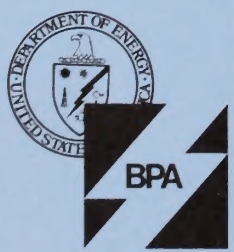
Environmental Impact Statement

Proposed Eugene - Medford 500 kV Transmission Line



United States Department of the Interior

BUREAU OF LAND MANAGEMENT



United States Department of Energy

BONNEVILLE POWER ADMINISTRATION

State of Oregon

DEPARTMENT OF ENERGY

IN REPLY REFER TO:
1792 PP&L (935)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

OREGON STATE OFFICE
P.O. Box 2965 (825 NE Multnomah Street)
Portland, Oregon 97208

This draft environmental impact statement addresses a proposed 500 kilovolt electrical transmission line linking Eugene and Medford, Oregon. Preparation of this statement is a step in the process leading to decisions from the responsible government agencies on requested authorization of the project. The statement analyzes impacts which would result from the proposed action, three alternatives, and 13 routing or construction options. Its purpose is to disclose probable effects on the natural, social and economic environment for consideration in the decisionmaking process.

Comments concerning the adequacy of analysis in this statement will be accepted until July 7, 1982. Written comments on the EIS may be addressed to:

Bureau of Land Management
Planning and Environmental Coordination Staff (935)
P.O. Box 2965
Portland, Oregon 97208

In addition, public hearings for the purpose of receiving oral comments will be conducted at the following locations, places and times.

Medford City Hall, Council Chambers
411 West 8th
Tuesday, June 15, 1982. 7:30 p.m.

Douglas County Courthouse, Room 216
1036 SE Douglas
Wednesday, June 16, 1982. 7:30 p.m.

Eugene City Hall, Council Chambers
777 Pearl St.
Thursday, June 17, 1982. 7:30 p.m.

All comments, written and oral, will be considered in preparation of the final EIS which will be available prior to any Federal decisions. Attached is a brief explanation of the role of the agencies involved with the analysis.

Lawrence D. Fawell

Oregon State Director
Bureau of Land Management

Enclosure 1
Agency Roles

Agency Roles in the Eugene to Medford 500 kV Transmission Line

The proponent of this line, Pacific Power and Light Company, has applied for basic rights-of-way across public lands administered by the Bureau of Land Management (approximately 15 percent of the 146.8 mile proposed project). BLM was designated as lead agency for the preparation of an environmental impact statement.

Under provision of Oregon law PP&L has submitted a Site Certificate Application to the Oregon Energy Facility Siting Council (EFSC) which has State jurisdiction for projects of this nature. The Oregon Department of Energy, is a cooperating agency for the EIS.

Bonneville Power Administration (BPA) would provide 500 kV service to the proposed line and became a cooperating agency for the EIS at the outset. If the preferred location is selected, BPA would build the initial 11.5 miles of the project beginning at their Lane Substation west of Eugene.

These three government agencies entered into a memorandum of understanding on how to carry out the environmental analysis. Under terms of that memorandum Envirosphere Company was selected to prepare this EIS and other supporting documentation on behalf of BLM. Routing studies in the Eugene and Medford areas and technical investigation of the existing transmission corridor between the study areas have been completed. Copies of the Routing Study and Technical Investigation Reports are available for review in local libraries throughout the project area; PP&L offices; BLM offices in Medford, Roseburg and Eugene; and the BPA office in Eugene.

DEPARTMENT OF THE INTERIOR

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

EUGENE-MEDFORD 500 KV TRANSMISSION LINE

INT DES 82-16

Prepared by

ENVIROSPHERE COMPANY

For the

BUREAU OF LAND MANAGEMENT

OREGON STATE OFFICE

State Director, Bureau of Land Management

Director, Oregon Department of Energy
Cooperating Agency

EUGENE-MEDFORD 500 KV TRANSMISSION LINE

Draft (x) Final ( ) Environmental Impact Statement

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies: U.S. Department of Energy, Bonneville Power Administration and State of Oregon Department of Energy

State and Counties Involved: State of Oregon, Lane, Douglas, and Jackson Counties

1. Type of Action: Administrative (x) Legislative ( )

2. Abstract: Pacific Power and Light Company and BPA propose to build a 146.8 mile 500 kV transmission line from Eugene to Medford based on a need to reliably serve growing electrical loads in southern Oregon and northern California. BPA would build 11.5 miles of the line from Lane Substation (west of Eugene) to Spencer Switching Station (south of Eugene), parallel to an existing line for 7.5 miles and would replace existing lines for the remaining 4.0 miles. Pacific would build 135.3 miles of the line replacing existing 230 kV lines over most of this distance, except for the 27 miles closest to Meridian Substation (east of Medford) and the 13.4 miles of new alignment between Dixonville and Ramsey Canyon. This proposal is the agency "preferred alternative" in this EIS. Other alternatives include no action, and constructing either a parallel or double circuit line. The no action alternative affects social and economic conditions by not reliably meeting future electricity requirements. The parallel line would affect all resources to a greater extent than the preferred alternative while the double circuit alternative would have impacts similar to the preferred one except for lesser long-term impacts of the double circuit option because it would eliminate the need to build a parallel line in the future. In addition, thirteen options applicable to several alternatives are analyzed. The most important ones are in the Medford Basin where the agency preferred alternative would circle the Medford Basin on the north and east and would cross the Rogue River approximately 2 miles south of Shady Cove. The west route options, Options H and K, would avoid Sams Valley but pass through White City, while the existing corridor options, Options I and L, would pass through Sams Valley and White City. Impacts for the options which follow portions of existing corridors (H, I, L, and M) would be primarily related to visual and land use while the preferred alternative within the Medford Basin would involve a new corridor and impacts to all resource categories. Options K, L, and M allow for future transmission line expansion.

3. Alternatives Analyzed:

   a. Pacific Power and Light Company and BPA Proposal, Preferred Alternative
   b. No Action, Alternative 1
   c. Parallel Alternative, Alternative 2
   d. Double Circuit Alternative, Alternative 3
   e. Thirteen options within these alternatives

4. Draft statement made available to EPA and the public in May 1982. The comment period will be 60 days beginning after the draft is filed with the Environmental Protection Agency and the Notice of Availability is published in the Federal Register. This notice is anticipated in May 1982.

5. For further information contact:

   Mr. Roland D. Smith
   Bureau of Land Management
   Oregon State Office
   P.O. Box 2965 (825 N.E. Multnomah St.)
   Portland, Oregon 97208
   Telephone: (503) 231-6951

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES (Continued)

SUMMARY

SUMMARY

PURPOSE

This Environmental Impact Statement (EIS) describes and analyzes the environmental impacts of a proposed 500 kV transmission line from Eugene to Medford, Oregon. The project is being proposed by Pacific Power and Light Company (Pacific) to reliably serve anticipated electric loads in Pacific's southern Oregon and northern California service area. An additional project purpose identified by the Bonneville Power Administration (BPA) is to satisfy a future requirement to upgrade service in the Eugene area.

ALTERNATIVES

The objective of the construction alternatives would be to connect Meridian Substation east of Medford with either Lane or Alvey Substation near Eugene. The first alternative accomplishing this objective is the agency preferred alternative, as identified by the Bureau of Land Management (BLM) of the U.S. Department of the Interior (the lead government agency for environmental analysis on the project) and the other cooperating agencies. The preferred alternative determined the project configuration proposed by Pacific in its Site Certificate Application to the State of Oregon Energy Facility Siting Council (EFSC). The preferred alternative reflects input received from BPA concerning the portion of the line it would construct. Three alternatives to this proposal, including a no action alternative, are also analyzed in the EIS.

The preferred alternative would consist of 146.8 miles of 500 kV transmission line between Lane and Meridian Substations. The precise configuration of the proposed line, in terms of structure type, right-of-way requirements and other design factors, varies considerably along the route. Most of the line would be carried on single circuit steel lattice towers, although double circuit lattice towers would be used for some segments. Existing lower voltage lines would be replaced along 98.9 miles or two-thirds of the route, 7.5 miles would be parallel construction, and 40.4 miles of new corridor would be developed. Circuit breakers and other equipment would be added at the existing Lane, Dixonville and Meridian Substations, but no new substations would be needed to accommodate the proposed line.

BPA would construct 11.5 miles of line within or parallel to its existing corridor from Lane Substation to Spencer Switching Station in the Eugene area. Pacific's portion of the preferred alternative would consist primarily of replacing 94.9 miles of an existing 230 kV line from Spencer to Ramsey Canyon, interspersed with new corridor segments totalling 13.4 miles located near Canyonville, Green Mountain, and Evans Creek. The remaining 27 miles from Ramsey Canyon to Meridian Substation would be new corridor along the northern and eastern fringe of the Medford Basin.

The northern portion of the line from Lane to Dixonville would be built during 1985, while the Dixonville-Meridian portion would be built during 1987 and 1988. Due to the partial or complete use of existing right-of-way in various areas, requirements for additional right-of-way for the preferred alternative range from 0 to 175 feet. The overall estimated requirements for the construction alternatives are shown in Summary Table 1.

SUMMARY TABLE 1

PROJECT ALTERNATIVE REQUIREMENTS

Requirement	Agency Preferred Alternative	Parallel Alternative 2	Double Circuit Alternative 3
Corridor length (miles)	146.8	146.8	146.8
New right-of-way (acres)	1,323	2,543	1,323
New access roads (miles)	118.0	129.6	118.0
Cost ($ million)	69.2	74.6	121.6

Alternative 1, the no action alternative, which is not shown in Summary Table 1, assumes that no steps would be taken to meet the anticipated load growth in southern Oregon and northern California.

Alternatives 2 and 3 involve different design configurations. Both alternatives would follow the same alignment as the preferred alternative from Lane Substation to Meridian Substation, and both would retain the same division of ownership and construction responsibility between Pacific and BPA. Alternative 2 would involve construction of a parallel 500 kV circuit for 94.9 miles along the east side of Pacific's existing corridor from Spencer Switching Station to Ramsey Canyon; the parallel mileage corresponds to the replacement portions of the preferred alternative, leaving these two alternatives identical in the realignment and new corridor segments. Along the parallel segments, the existing corridor would have to be widened by 125 feet in some areas and 137.5 feet in others.

The distinguishing feature of Alternative 3 would be the use of double circuit steel lattice towers for the entire route from Lane to Meridian. These towers would be capable of supporting two 3-phase sets of conductors, and are larger and more costly than single circuit towers. Only one circuit would be strung initially, allowing for a second 500 kV line to be added in the future with no new right-of-way. The double circuit alternative would duplicate the preferred alternative in that it would be constructed primarily through

replacement of an existing line. Consequently, the right-of-way and access road requirements would be identical, although Alternative 2 would have a higher cost.

Thirteen options, representing substitute designs and routings for portions of the Eugene-Medford alternatives, have also been identified and evaluated in this EIS. Their estimated requirements are presented in Summary Table 2. Options A, B, and C would involve different alignments and configurations for the northern portion of the line, and generally reflect means of reducing the effect on urban and suburban development near Eugene. These options range from 2 miles to 14.2 miles in length, and would have varying effects on total project length, cost, and right-of-way requirements. Option D would be a 5.1-mile reroute away from the visually sensitive North Umpqua Highway north of Dixonville, and is very similar in length and cost to the corresponding section of the preferred alternative.

Eight of the remaining options would provide for use of portions of the existing corridor between Canyonville and Meridian Substation and would thereby avoid the increased environmental impacts associated with opening a new transmission corridor. Options E, F, and G would consist of existing corridor substitutes for the combined 13.4 miles of new alignment near Canyonville, Green Mountain, and Evans Creek. These options would be longer and more expensive than the corresponding portions of the preferred alternative, but would require less new right-of-way and access road construction.

Options H and L, the Medford Basin west routes, would combine 10.9 miles of new corridor with 19.5 miles of existing corridor to provide an alternate path to Meridian Substation. Option H would involve building only one line at present while not acquiring easements for future transmission lines in this corridor. Option L would involve acquiring an easement for two lines from West Fork Evans Creek to the junction with the existing line near Lyman Mountain and constructing a double circuit line to maximize future use of the existing corridor through White City. Options I and M also provide an alternative to the preferred route through the Medford Basin. These options would follow existing corridors for their entire length and would pass through Sams Valley and White City. Option I would involve building only one line, while Option K would involve constructing a double circuit line and acquiring additional rights-of-way now to fully utilize corridors in the future. All four of these options would require less new right-of-way than the preferred alternative, although Options L and M would be substantially more expensive. Option K also considers long-term transmission needs as it would involve the acquisition of additional right-of-way now along the east (agency preferred) route to accomodate a future 500 kV transmission line. Option J represents an underground crossing of the Rogue River near Medford along either the proposed or the existing corridor. It would reduce the project's right-of-way and access road requirements somewhat, but would add several million dollars to total project cost.

SUMMARY TABLE 2
PROJECT OPTION REQUIREMENTS

	Corridor Length (Miles)	New Right-of-way (Acres)	New Access (Miles)	Cost (Dollars)
Option A (Lane-115 kV)	7.5	0.0	0.9	6,900,000
Corresponding Portion of Preferred Alternative	7.5	113.6	1.6	7,300,000
Option B (Lane-Camas Swale)	14.2	258.8	18.3	11,930,000
Corresponding Portion of Preferred Alternative	16.3	136.6	3.0	13,924,000
Option C (Alvey-Spencer)	2.0	30.3	0.6	3,010,000
Corresponding Portion of of Preferred Alternative	11.5	113.6	2.3	11,900,000
Option D (Umpqua Hwy Bypass)	5.1	95.5	2.5	2,434,000
Corresponding Portion of Preferred Alternative	5.1	0.0	0.6	1,970,000
Option E (Canyonville Existing)	4.2	38.2	0.8	2,323,000
Corresponding Portion of Preferred Alternative	2.7	57.3	8.1	1,402,000
Option F (Green Mtn Existing)	7.9	71.8	1.5	3,579,000
Corresponding Portion of Preferred Alternative	6.9	146.4	20.7	3,127,000
Option G (W.F. Evans Ck Existing)	4.5	40.9	0.7	2,158,000
Corresponding Portion of Preferred Alternative	3.8	80.6	10.1	1,999,000
Medford Basin Options[1/]				
Option H (West Route)	30.4	502.6	36.3	16,062,000
Option I (Existing Corridor)	28.5	376.4	15.2	15,270,000
Option K (Preferred, Ultimate)	31.3	1132.1	73.8	15,636,000
Option L (West, Ultimate)	30.4	737.5	33.6	22,582,000
Option M (Existing, Ultimate)	28.5	489.0	15.6	21,159,000
Corresponding Portion of Preferred Alternative	31.3	657.8	73.8	14,906,000

1/ Originating at West Fork Evans Creek. Option J, Underwater Crossing, is not included in this comparison as its requirements are not readily comparable for the parameters in this table.

AFFECTED ENVIRONMENT

The physical setting of the project area consists primarily of rural interior valleys, foothills, and low mountains. Local relief is greatest from near Canyonville to Ramsey Canyon, with generally rolling terrain north of Canyonville. Major drainage basins within the project area include those of the Willamette (Coast Fork), Umpqua, and Rogue Rivers. The most prevalent vegetation type along the Eugene-Medford corridor is forest dominated by Douglas fir, although vegetation communities featuring oak, mixed oak and conifer, grasslands, ponderosa pine, and shrubs are also extensive along various parts of the alternate routes. Wildlife is varied and abundant, with major species of interest including black-tailed deer, Columbian white-tailed deer, bald eagle, osprey, spotted owl, waterfowl, and salmon and trout.

The dominant aspect of the settlement pattern in the project area is the concentration of urban development near Eugene and Medford and along Interstate 5. The proposed route would generally be located east of and parallel to this freeway corridor, through open agricultural and forest land. Urban and suburban development occurs in the Eugene area and in the Medford Basin. Farms, woodlands, and rural residences are the most common land uses in the northern portion of the route, giving way first to ranching and then forestry further south. Farms and homes are generally confined to the larger stream valleys along most of the route, with very few residences in the forested areas. Project alternatives would be located near several local recreation sites, while some dispersed recreation activities occur in the project area. Visual character and sensitivity along the route vary with the level of development, physical features, and degree of human use.

COMPARISON OF ALTERNATIVES

All of the alternatives, except the no action alternative, would satisfy the need of this project. If a future requirement developed for a second 500 kV line in this corridor, this requirement could be met by the parallel or double circuit alternative and the ultimate development options (Options K, L, and M) in the Medford Basin.

The uncertainty of future load levels and characteristics make it difficult to identify and predict the social, economic, and transmission system effects of the no action alternative. These effects would at least consist of increased potential for forced outages in the mid 1980s and beyond and could include restriction of economic growth in the area.

Environmental Comparison

The environmental consequences of the project essentially revolve around the right-of-way and access road requirements identified in Summary Tables 1 and 2. Physical and biological impacts of the action

would include soil erosion, sedimentation, forest and riparian vegetation clearing, and various types and degrees of disturbances affecting local wildlife. All of these effects are related to the magnitude of surface disturbance during construction (and to some extent during operation), and tend to increase with the amount of clearing and access road construction. The level of some social and economic impacts are also directly tied to the physical requirements of the transmission line, particularly concerning interference with agriculture and the removal of forest land from production. Other social impacts depend on the proximity of people to the line or, in the case of the no action alternative, would be felt by persons who consume electricity in southern Oregon and northern California. A narrative comparison of significant impact areas is provided below with more detailed information appearing in Chapters 1 and 3.

Physical Sciences

Significant impacts associated with the physical environment (air and water resources, soils, and geology) would be limited to increased erosion and sedimentation in the area of West Fork Evans Creek. New and upgraded access road construction and tower site work would be the primary cause of increased erosion and sedimentation in this area. The highly erodible granitic soils near West Fork Evans Creek make erosion difficult to control, although practices required by BLM and the State of Oregon would limit impacts. It is, nevertheless, uncertain that impacts in this area would be reduced to a level of insignificance.

Biological Sciences

Construction of the preferred alternative, Alternatives 2 or 3, or Option K would have moderately significant wildlife impacts along the new corridor segment in the Medford area. The loss of habitat caused by access road and other construction activities as well as the increased disturbance by human activity which would likely occur during and after construction would reduce the quality of wildlife habitat in those presently remote areas north and east of Medford. Impacts due to new access road construction in new alignment portions of Options H and L are not expected to be significant due to the steepness of the area, which inhibits human access, and the lower amount of new access road construction relative to the preferred alternative. Of the routes under consideration in the Medford area, the route of Options I and M would minimize wildlife impacts resulting from access road construction.

Impacts to salmonids might be moderately significant in the West Fork Evans Creek drainage due to sedimentation problems resulting from unstable soils for all construction alternatives. Alternative 2 would have the greatest potential for signficant impacts in this area. None of the options would modify the potential for impacts.

Social Sciences

Impacts on the social environment are broad, and in some instances, significant. Significant impacts occur in the areas of visual resources, recreation, and land use.

Recreation

Impacts of the project alternatives and options on recreation would be insignificant in most cases, but would be significant at a few specific sites. The recreation impacts of the proposed line would be limited to changes in the character of views from these sites that would detract from the quality of the recreation experience. Designated recreation sites along the preferred alternative include proposed sections of the Ridgeline Trail in South Eugene and Takelma Park near the Rogue River Crossing; impacts on both would be significant. In the case of Options H, I, L, and M in the Medford Basin, the existing corridor passes through Hoover Ponds and Medford Sports Park. Impacts on the former would not be significant if the park remains undeveloped, but could increase if the park is developed for passive uses such as nature trails and views. However, this appears unlikely. The intensive recreation activity at Medford Sports Park would not be affected by visual changes introduced by a transmission facility.

Adverse effects on dispersed recreation would be significant at the North Umpqua Highway. These impacts could be avoided and the visual impacts of the existing transmission lines could be rehabilitated to a large extent by rerouting the line down a side valley (Option D).

The impact on dispersed recreation along the Rogue River would be significant at the preferred alternative crossing, just north of Takelma Park. Options H, I, K, and L would not cause significant incremental impacts at the existing Rogue River crossing. The underground option, J, would have significant impacts on recreation during construction, but would reduce long-term visual impacts to a minimum.

Visual Resources

All of the alternatives with the exception of the no action alternative, would have significant visual impacts. The parallel alternative would have greater impacts than the preferred alternative, due to increased clearing and the retention of existing lines. The double circuit alternative would cause greater visual impacts than one single circuit line in the short term, but less impacts than two single circuit lines in the long term. The preferred and double circuit alternatives would cause high visual impacts in one area each, while the parallel alternative would cause high visual impacts in three areas. This number could be reduced or increased with the adoption of various options.

Options B and C would avoid the high impact segment of the Twin Oaks-Spencer section of the preferred alternative, although Option B would create significant impacts by opening a new corridor between Lane and Camas Swale. Option D, the North Umpqua Highway Bypass, would help to rehabilitate the adverse visual effects of the existing corridor along this designated scenic highway, thereby eliminating a significant impact site. Option E would have a significant impact on the I-5 corridor.

In the Medford Basin, the visual impact comparison of the preferred alternative and Option K to Options H, I, L, and M involves a tradeoff between viewer exposure and visual contrast with existing conditions. Options H, I, L, and M would be visible to many more people than the preferred alternative, but would not cause signficant contrast with existing visual resources or significant change in scenic quality, except in the Lower Table Rock area. Therefore, impacts would be categorized as moderately significant for these options. For the preferred alternative and Option K, which involve opening a new corridor, visual impacts are rated as high.

Land Use

The preferred alternative would have no effect on commercial and industrial uses because it would not cross areas used for these purposes. The existing corridor in the Medford Basin crosses an area of commercial and light industrial development in White City. Options H and I would have no effect on this development because they could be accommodated within the existing right-of-way. Options L and M would require more right-of-way and result in a significant land use impact. However, these options would establish a corridor in the Medford Basin that would accommodate future transmission development and would thus reduce the potential for significant land use conflicts later.

The primary effects of the preferred alternative on residential land use would be the decrease in visual amenity now associated with a number of residential areas that the proposed line would cross. These adverse effects would be significant in the South Eugene area, where a large number of residences occur near the existing corridor, and in the Medford Basin, where a new route would be opened through terrain which is sparsely populated now but which appears likely to be developed for rural residential use. Alternatives 2 and 3 would cause a significant increment of visual impact at other residential concentrations, including Lynx Hollow, West Cottage Grove, Fairoaks, and Elkhead.

Options B and C would avoid the heavily developed Fox Hollow Road area in South Eugene and so would reduce visual impacts on residential land use. Option B, however, would open a new corridor through a developing rural residential area and would create moderate impacts. In the Medford Basin, where all options have moderately significant impacts, Options H, I, L, and M would increase residential impacts associated with incremental visual intrusion along the existing corridor, but

would avoid other impacts associated with opening a new corridor through more sparsely developed terrain on the perimeter of the Medford Basin. Options L and M also appear to require the purchase of three residences near the Meridian Tap to reserve sufficient right-of-way for possible future 500 kV development.

Economic and Social Conditions

The effects of the proposed transmission line on agricultural and forest productivity, local tax bases, and economic activity in the surrounding area would be insignificant, although some individual landowners would experience or perceive adverse effects. Social consequences resulting from an influx of transmission line workers, noise, and electrical and magnetic effects would also be insignificant. Adverse social reaction to the project would likely be significant in some areas, although this response cannot be measured and stems directly from land use, visual and other impacts. Negative economic and social effects could result from the no action alternative, but the severity and likelihood of such effects cannot be established.

CHAPTER 1

DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

PURPOSE OF AND NEED FOR ACTION

PURPOSE OF ACTION

Purposes are the goals Pacific Power and Light (Pacific) and Bonneville Power Administration (BPA) intend to accomplish with the proposal. Specifically, the purposes to be achieved by the proposal are to:

1) minimize environmental impacts
2) provide a reliable system for electrical service
3) plan to accommodate future needs
4) minimize costs
5) comply with all existing laws

NEED FOR ACTION

Increasing electric load in Pacific southern Oregon and northern California service areas will soon exceed the capability of the transmission system to carry those anticipated loads and will result in the interruption of electric service (forced customer outages).

The historic peak loads for Pacific's northern California and southern Oregon service area and certain BPA customers within this area to which Pacific delivers energy are shown below.

Operating Period (July-June)	Peak-MW
1971-72	741
1972-73	883
1973-74	795
1974-75	837
1975-76	944
1976-77	1006
1977-78	977
1978-79	1100
1979-80	1120
1980-81	1072

Table 1-1 shows the forecasted load growth in the area through the winter of 1989-1990. The cause for this growth has been attributed to expanding residential, commercial, and industrial electrical consumption in the Pacific service area. This information has been compiled from forecasts submitted by Pacific and BPA. The methodology used in developing these forecasts is similar to the approach used by the State of Oregon Department of Energy in developing its biennial forecast of state energy demands.

The forecasts indicate annual average energy percentage growth rates ranging from 3.8 percent to 5.6 percent. The percentage increase reflects recovery from current poor economic conditions. Additional transmission support is needed to meet the forecasted load demands,

TABLE 1-1
PACIFIC POWER AND LIGHT COMPANY
FORECAST OF SYSTEM FIRM LOADS,
SOUTHWEST DIVISION, EXCLUDING COOS BAY AND INCLUDING
LOADS SERVED BY BONNEVILLE POWER ADMINISTRATION

PEAK-MW

		BPA LOADS		Less Estimated Transmission		
	Pacific Loads[1]	City of Ashland[2]	Other BPA Loads[3]	Losses[4]	Total Net Area Load	
1981-82	1134	37	155	49	1277	
1982-83	1199	39	158	51	1345	
1983-84	1260	41	162	53	1410	
1984-85	1337	43	166	55	1491	
1985-86	1431	46	170	57	1590	Phase I scheduled for completion by this peak period
1986-87	1518	48	175	59	1682	
1987-88	1552	50	180	62	1720	
1888-89	1606	51	186	64	1779	Phase II scheduled for completion by this peak period.
1989-90	1642	52	191	67	1818	

ANNUAL AVERAGE PERCENTAGE GROWTH RATES

1981-82 to 1985-86	5.6 percent
1985-86 to 1988-89	3.8 percent
1981-82 to 1988-89	4.9 percent

Sources:
1 Pacific Power and Light Company, Southwest Division Forecast, September 1981.
2 Load Forecasting and Analysis Dept., Pacific Power and Light Company.
3 Bonneville Power Administration.
4 Electrical Engineering Dept., Pacific Power and Light Company.

provide reliable electric service, improve the regional transmission system reliability, and meet Pacific's customer service requirements in southern Oregon and northern California. Power is currently transmitted to this area by one 500,000 volt transmission line between Midpoint, Idaho and Medford, Oregon with a connection at Malin and four 230,000 volt transmission lines: two from Eugene to Roseburg, one from Malin, Oregon to Klamath Falls, and one from Redmond, Oregon to Klamath Falls. This system, with internal hydroelectric generation in the area, has a firm capability of serving 1482 megawatts of peak load.

This system would be unable to withstand one major unscheduled outage beyond the winter of 1985-1986 without an interruption in service. At that time, an outage of Pacific's Malin to Medford 500 kV transmission line would cause system voltages in the southern Oregon and northern California areas to drop to an unacceptably low level under peak load conditions and would result in power outages.

The staff of the State of Oregon Public Utility Commissioner, in testimony before the Energy Facility Siting Council, indicated that additional transmission support is needed to provide reliable electric service to Pacific's service area in southern Oregon and northern California (Oregon EFSC 1982).

Additional transmission support is needed to the Roseburg area by the winter of 1985-1986 (Phase I of proposed action); additional transmission support to the Medford area is needed for the winter of 1988-1989 (Phase II of proposed action).

The system, if completed as proposed, will increase transmission capability to approximately 2500 MW of peak load.

OTHER NEEDS

Although the anticipated load growth in southern Oregon and northern California is the predominant need for the Eugene-Medford line, anticipated load growth in the Eugene area defines a future requirement which can be satisfied concurrently with the need to increase transmission capability to southern Oregon.

BPA load growth projections indicate a potential problem with the reliability of service in the Eugene area in the mid-1990's. The current combined load for all BPA customers in Eugene is projected in the Fiscal Year 83 load studies at 1000 megawatts. In the mid-1990's, based on the Pacific Northwest Utilities Conference Committee (PNUCC) projections developed in 1981, these loads will increase to 1500 megawatts. The amount of electricity required to satisfy this demand will exceed the transmission capacity of the existing system. Overloading the lines and equipment will cause them to malfunction or be permanently damaged. As a result, the BPA service to the Eugene area will not be reliable and will require strengthening.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The basic objective of the construction alternatives is to connect Meridian Substation east of Medford with either Lane or Alvey Substation near Eugene. The first alternative accomplishing this objectives is the agency preferred alternative, as identified by the Bureau of Land Management (BLM) of the U.S. Department of the Interior (the lead government agency for environmental analysis on the project) and the other cooperating agencies. The preferred alternative determined the project configuration proposed by Pacific in its Site Certificate Application to the Energy Facility Siting Council (EFSC) of the State of Oregon. The preferred alternative reflects input received from BPA concerning the portion of the line which that agency would construct. Alternatives to the preferred alternative include Alternative 1, the no action alternative; Alternative 2, the parallel alternative; and Alternative 3, the double circuit alternative. These alternatives are described and compared in this section.

To satisfy future requirements, BPA has assumed the responsibility for the proposed construction in the Eugene area. BPA long-range planning has anticipated the construction of a 500 kV transmission line between the Lane and Alvey Substations. The line and its associated facilities in the substations would allow for the transmission of the additional power required in the area. Construction would enclose the City of Eugene within a 500 kV transmission loop. This loop, a common utility practice for bringing electricity into metropolitan areas, has the capability to provide reliable service under almost all anticipated adverse operating conditions.

Although the requirement for the tie between Lane and Alvey is not forecasted until the mid-1990's, the Eugene-Medford transmission proposal by Pacific has prompted BPA to consider building part of the interconnection by 1986. The proposed construction would satisfy the immediate need of Pacific for a 500 kV source at Eugene as well as part of the future BPA requirement for a loop around Eugene. The joint proposal would also be consistent with the other purposes of BPA's future planning, especially the goals to minimize impacts to the environment and to accommodate future needs and provide reliable electrical service.

In addition to these alternatives, there are thirteen routing and design options, identified as Options A through M, which could be employed in various sections of the line. The options differ from the alternatives in that the options are modifications that affect only a portion of the route between Eugene and Medford, and therefore could be adopted for more than one alternative. An orientation map is presented in Figure 1-1, while more detailed information on the options and alternatives is shown in Figures 1-2 and 1-3.

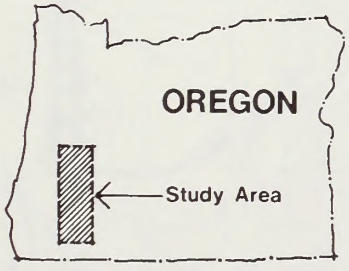
FIGURE 1-1
ORIENTATION MAP

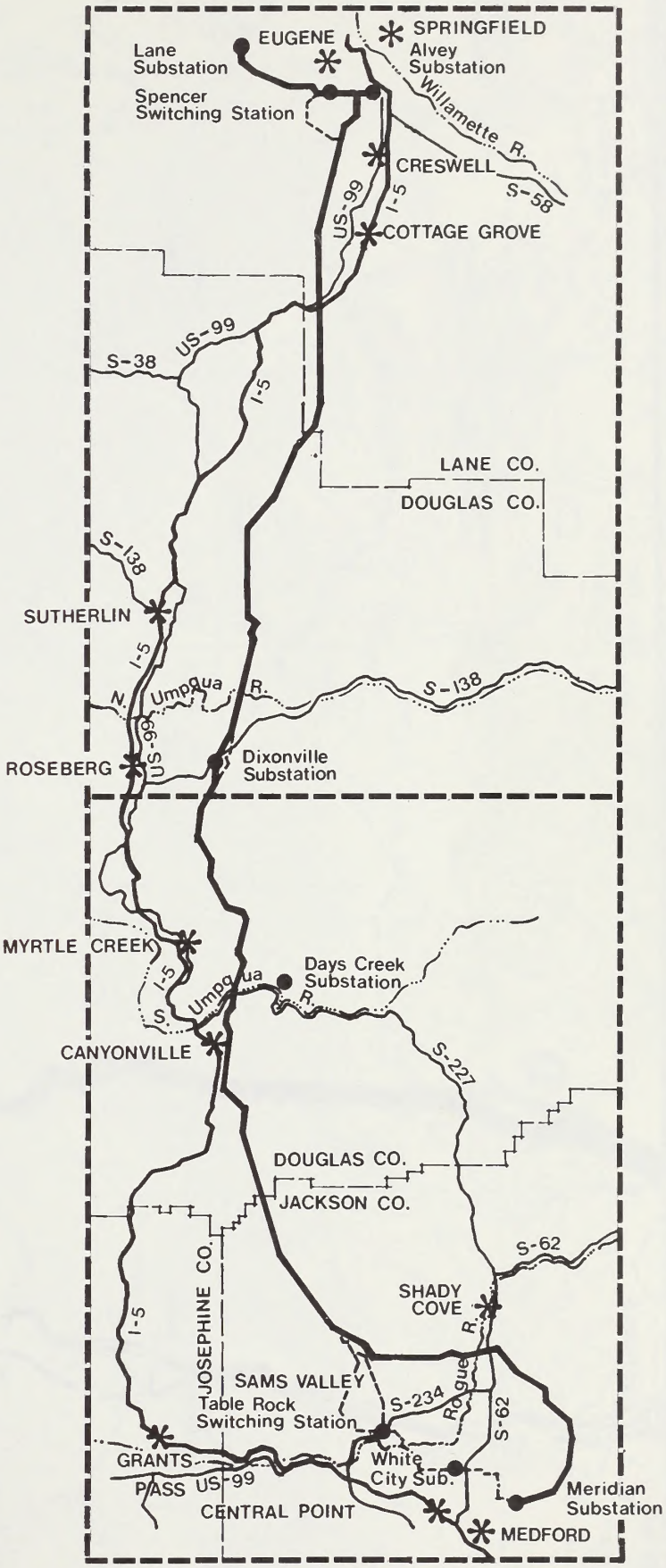
- TOWNS & CITIES
- EXISTING SUBSTATIONS & SWITCHING STA.
- PREFERRED ALTERNATIVE
- OPTIONS WITHIN PREFERRED AND OTHER ALTERNATIVES
- INTERSTATE HIGHWAY
- STATE OR U.S. HIGHWAY
- COUNTY LINE
- RIVER
- STUDY MAP LIMITS

Proposed
EUGENE MEDFORD 500kV
TRANSMISSION LINE

for Pacific Power & Light

north





SCALE IN MILES 0 5 10 20 30 40

ORIENTATION MAP

FIGURE 1-2

Preferred & Alternative Transmission Line Routes

Eugene-Roseburg

PREFERRED ALTERNATIVE (Alignments for Alternatives 2 end 3 ere the seme.)

EXISTING SUBSTATIONS AND SWITCHING STATIONS

OPTIONS WITHIN PREFERRED AND OTHER ALTERNATIVES

A — OPTION A-LANE TO TWIN OAKS: Replece existing BPA line with double-circuit

B — OPTION B-TWIN OAKS TO CAMAS SWALE: New corridor

C — OPTION C-ALVEY TO SPENCER: Parallel existing corridor

D — OPTION D-N. UMPQUA HIGHWAY BYPASS: Reroute along PPL line 39

Proposed
EUGENE MEDFORD 500 kV
TRANSMISSION LINE
Draft EIS

scale: 1:250,000

north

Lane Sub.
Twin Oaks
Camas Swale
Spencer Sw. Sta.
Alvey Sub.
A
B
C
D
Preferred Alternative and Alternatives 2 and 3
Roseburg
Sutherlin
Drain
Cottage Grove
EUGENE
SPRINGFIELD
LANE COUNTY
DOUGLAS COUNTY
CALAPOOYA DIVIDE

PREFERRED & ALTERNATIVE TRANSMISSION LINE ROUTES

FIGURE 1-2

FIGURE 1-3

Preferred & Alternative Transmission Line Routes

Roseburg-Medford

PREFERRED ALTERNATIVE (Alignments for Alternatives 2 and 3 are the same.)

EXISTING SUBSTATIONS AND SWITCHING STATIONS

OPTIONS WITHIN PREFERRED AND OTHER ALTERNATIVES

E — OPTION E-CANYONVILLE Existing corridor

F — OPTION F-GREEN MOUNTAIN: Existing corridor

G — OPTION G-WEST FORK EVANS CREEK TO RAMSEY CANYON: Existing corridor

H — OPTION H-EVANS CREEK TO MERIDIAN: Medford Basin west route

I — OPTION I-RAMSEY CANYON TO MERIDIAN: Medford Basin existing corridor

J — OPTION J -ROGUE RIVER: Underwater crossings

K,L,M — OPTIONS K,L,M: Ultimate development options, Medford Basin

Proposed

EUGENE MEDFORD 500 kV TRANSMISSION LINE

Draft EIS

scale: 1:250,000

north

SCALE IN MILES

Roseburg

Dixonville Sub.

Preferred Alternative, and Alternatives 2 and 3

West Fork Evans Creek

Ramsey Canyon

Table Rock Sw. Sta.

White City Sub.

Meridian Sub.

Meridian Tap

Grants Pass

PREFERRED & ALTERNATIVE TRANSMISSION LINE ROUTES

FIGURE 1-3

The completion of the 500 kV loop around Eugene is a connected action. To complete the loop, a combination of the preferred alternative and Option C or a combination of Option A and Option C would be constructed (see pp. 1-20 through 1-22). Impacts of these actions are identified, analyzed and compared in this Draft EIS.

A concise description of the alternatives and options is difficult because important parameters such as tower design and new access road and right-of-way requirements vary within each alternative. This variability exists because some alternatives and options involve replacing or paralleling transmission lines which were built at different times and which require different degrees of alteration to support a 500 kV transmission line. Further, two proponents are involved in this project, Pacific and BPA. The involvement of two utilities which employ different designs for their lines adds more variability to this project. Pacific would own and operate the portion of the proposed line south from Spencer Switching Station, which is approximately one mile south of Eugene, to Meridian Substation near Medford (see Figures 1-2 and 1-3). BPA would own and operate the line built from Spencer to either Lane or Alvey Substation.

Each alternative has been divided into segments to allow for more accurate and detailed description. The endpoints of these segments were defined so that the design parameters would be relatively unchanged within each segment. The endpoints of the segments are identified on Figures 1-2 and 1-3. Tables 1-2 and 1-3 present the pertinent design parameters for the alternatives and options. More detailed discussion of the design and right-of-way modifications associated with each alternative and option follows immediately, supported by sketches, while standard design information common to all construction alternatives is presented later in this section.

When evaluating information presented in Tables 1-2 and 1-3 and throughout this EIS, one should be aware that to date only preliminary engineering studies have been completed. As a result, quantification of the line's requirements and environmental impacts is based on assumptions of typical conditions applied to the alternatives and options under consideration. Each alternative and option is described below.

PREFERRED ALTERNATIVE

The agency preferred alternative is used as a benchmark for comparison throughout this EIS to clearly present pertinent facts as briefly as possible. With the number of options analyzed in this EIS it was determined most efficient to describe alternatives and options relative to the preferred alternative and key these descriptions to figures and tables in the text. As a result, some information presented in this discussion will also be referenced later in the text.

TABLE 1-2
ALTERNATIVES SUMMARY OF REQUIREMENTS

Segment Name	Length (Miles)	New R/W width (Feet)	New R/W (Acres)	New Access Roads (Miles)	New Cleared R/W (Acres)	Tower Type	Cost ($)	
Agency Preferred Alternative[1]								
Lane Substation-Twin Oaks (Parallel existing line on south side)	7.0	125.0	106.1	1.6	44.8	Lattice	7,300,000 [2]	
Twin Oaks - Spencer Switching Station							4,600,000 [2]	
(Twin Oaks-Junction w/115 kV lines; parallel existing 230 kV line on north side)	0.5	125.0	7.5	0.2	2.4	Lattice	500,000	
(Junction w/115 kV lines-Spencer Switching Station; replace existing 8PA 115 kV lines with 500 kV double circuit line and 115 kV double circuit line)	4.0	0.0	0.0	0.5	0.0	Lattice Double Circuit	4,100,000	
							11,900,000	8PA Portion
Spencer Switching Station-Camas Swale (Replace Alvey-Oixonville line)								
(First 3.8 miles south of Spencer Switching Station)	3.8	50.0	23.0	0.6	5.5	Lattice		
(From 3.8 miles south of Spencer Switching Station to Camas Swale)	1.0	0.0	0.0	0.1	0.0	Lattice	2,024,000	
Camas Swale - Dixonville (Replace Alvey Dixonville)								
(Camas Swale-N. Umpqua Highway)	48.7	0.0	0.0	5.9	0.0	Lattice	19,474,000	
(N. Umpqua Highway-Oixonville)	5.1	0.0	0.0	0.6	0.0	Lattice		
Oixonville - Ramsey Canyon (Replace Line 54 north of West Fork Evans Creek)	35.8	75.0	324.6	5.9	192.1	Lattice	22,845,000	
(Canyonville-new alignment)	2.7	175.0	57.3	8.1	40.9	Lattice		
(Green Mountain-new alignment)	6.9	175.0	146.4	20.7	104.5	Lattice		
(West Fork Evans Creek/ Ramsey Canyon)								
new alignment	3.8	175.0	80.6	10.1	51.5	Lattice		
replace Line 54	0.5	75.0	4.5	0.1	3.0	Lattice		
Ramsey Canyon - Meridian Substation (New corridor east route)	27.0	175.0	572.7	63.6	357.6	Lattice	12,907,000	
	146.8		1,322.7	118.0	802.3		57,250,000	Pacific Portion
							69,150,000	Total Cost
Alternative 2 Parallel[1]								
Lane Substation-Twin Oaks (Parallel existing line on south side)	7.0	125.0	106.1	1.6	44.8	Lattice	7,300,000 [2]	
Twin Oaks - Spencer Switching Station							4,600,000 [2]	
(Twin Oaks-Junction w/115 kV lines; parallel on north side of existing 230 kV line)	0.5	125.0	7.5	0.2	2.4	Lattice	500,000	
(Junction w/ 115 kV lines-Spencer Switching Station; replace existing BPA 115 kV lines with 500 kV double circuit line and 115 kV double cirucit line)	4.0	0.0	0.0	0.5	0.0	Lattice	4,100,000	
							11,900,000	8PA Portion
Spencer Switching Station-Camas Swale (Parallel existing line on east side)	3.8	125.0	57.6	1.0	21.8	Lattice	2,471,000	
	1.0	125.0	15.2	0.1	1.2	Lattice		
Camas Swale - Dixonville (Parallel existing line on east side)								
(Camas Swale-N. Umpqua Highway)	48.7	137.5	811.7	11.9	490.8	Lattice	23,669,000	
(N. Umpqua Highway-Oixonville)	5.1	137.5	85.0	1.1	1.4	Lattice		
Oixonville - Ramsey Canyon (Parallel existing line on east side north of West Fork Evans Creek)	35.8	137.5	595.0	10.5	432.3	Lattice	23,658,000	
(Canyonville new alignment)	2.7	175.0	57.3	8.1	40.9	Lattice		
(Green Mountain new alignment)	6.9	175.0	146.4	20.7	104.5	Lattice		
(West Fork Evans Creek-Ramsey Canyon)								
new alignment	3.8	175.0	80.6	10.1	51.5	Lattice		
replace line 54	0.5	137.5	8.3	0.2	6.8	Lattice		
Ramsey Canyon - Meridian Substation (New corridor east route)	27.0	175.0	572.7	63.6	352.6	Lattice	12,907,000	
	146.8		2,543.4	129.6	1,551.0		62,705,000	Pacific Portion
							74,605,000	Total Cost
Alternative 3-Double Circuit[1]								
Lane Substation-Twin Oaks (Parallel existing line on south side)	7.0	125.0	106.1	1.6	44.8	Lattice Double Circuit	7,300,000	
Twin Oaks - Spencer Switching Station						Lattice Double Circuit (both cases)	4,600,000 [2]	
(Twin Oaks-Junction w/115 kV lines, parallel existing 230 kV line on north side)	0.5	125.0	7.5	0.2	2.4		500,000	
(Junction w/115 kV lines-Spencer Switching Station; replace existing BPA 115 kV lines with 500 kV double circuit line and 115 kV double circuit line)	4.0	0.0	0.0	0.5	0.0		4,100,000	
							11,900,000	8PA Portion
Spencer Switching Station-Camas Swale (Replace Alvey-Oixonville line)						Lattice Double Circuit (both cases)		
(First 3.8 miles south of Spencer Switching Station)	3.8	50.0	23.0	0.6	5.5		3,870,000	
(From 3.8 miles south of Spencer Switching Station to Camas Swale)	1.0	0.0	0.0	0.1	0.0			
Camas Swale - Oixonville (Replace Alvey Dixonville)								
(Camas Swale-N. Umpqua Highway)	48.7	0.0	0.0	5.9	0.0	Lattice Double Circuit (both cases)	39,582,000	
(N. Umpqua Highway-Dixonville)	5.1	0.0	0.0	0.6	0.0			
Oixonville - Ramsey Canyon (Replace Line 54 north of West Fork Evans Creek)	35.8	75.0	324.6	5.9	192.1	Lattice Double Circuit	42,881,000	
(Canyonville-new alignment	2.7	175.0	57.3	8.1	40.9			
(Green Mountain-new alignment	6.9	175.0	146.4	20.7	104.5			
(West Fork Evans Creek/ Ramsey Canyon)								
new alignment	3.8	175.0	80.6	10.1	51.5			
replace Line 54	0.5	75.0	4.5	0.1	3.0			
Ramsey Canyon - Meridian Substation (New corridor east route)	27.0	175.0	572.7	63.6	357.6	Lattice Double Circuit	23,356,000	
	146.8		1,322.7	118.0	802.3		109,689,000	Pacific Portion
							121,589,000	Total Cost

1/ Design at North Umpqua River Crossing is not defined.
2/ 8PA costs, all other costs in table are Pacific Power and Light Company costs.

TABLE 1-3
OPTIONS SUMMARY OF REQUIREMENTS

Segment Name	Length (Miles)	New R/W width (Feet)	New R/W (Acres)	New Access Roads (Miles)	New Cleared R/W (Acres)	Tower Type	Cost ($)
Option A: Lane Substation-Junction w/115 kV lines (Replace existing BPA 230 kV line)							
Lane Substation-Twin Oaks	7.0	0.0	0.0	0.8	0.0	Lattice Dbl Circuit	
Twin Oaks-Junction w/115 kV lines	0.5	0.0	0.0	0.1	0.0	Lattice Double	
	7.5		0.0	0.9	0.0	Circuit	6,900,000 1/
Option B: Lane Substation - Camas Swale (New Corridor)							
Lane Substation - Twin Oaks (South side of existing BPA 230 kV line)	7.0	125.0	106.1	1.6	44.8	Lattice	7,300,000 1/
Twin Oaks - Camas Swale (New corridor)	7.2	175.0	152.7	16.7	87.9	Lattice	4,630,000
	14.2		258.8	18.3	132.7		11,930,000
Option C: Alvey Substation-Spencer Switching Station (Parallel)	2.0	125.0	30.3	0.6	15.8	Lattice	3,010,000
Option D: North Umpqua Highway Bypass	0.9	175.0	19.1	1.5	0.0	Lattice	
	4.2	150.0	76.4	1.0	4.5	Lattice	
	5.1		95.5	2.5	4.5		2,434,000
Option E: Canyonville (Existing Corridor)	4.2	75.0	38.2	0.8	21.8	Lattice	2,323,000
Option F: Green Mountain (Existing Corridor)	7.9	75.0	71.8	1.5	47.9	Lattice	3,579,000
Option G: West Fork Evans Creek-Ramsey Canyon (Existing Corridor)	4.5	75.0	40.9	0.7	24.2	Lattice	2,158,000

1/ BPA costs, all other costs are Pacific costs.

TABLE 1-3 (Continued)
OPTIONS SUMMARY OF REQUIREMENTS

Segment Name	Length (Miles)	New R/W width (Feet)	New R/W (Acres)	New Access Roads (Miles)	New Cleared R/W (Acres)	Tower Type	Cost ($)
Option H: Medford Basin West Route							
West Fork Evans Creek-Lyman Mountain[2/]							
new alignment	10.9	175.0	231.2	31.7	160.6	Lattice	
replace line 54	1.3	75.0	11.8	0.2	6.7	Lattice	
Lyman Mountain-Table Rock Substation (Parallel)	1.8	137.5	30.0	0.5	20.5	Lattice	
Table Rock Substation-White City Substation (Parallel on north side)	7.5	137.5	125.0	1.9	24.6	Lattice	
White City Substation-White City Rifle Range (Parallel within existing right-of-way)	3.0	0.0	0.0	0.4	0.0	Single Pole	
White City Rifle Range-Meridian Tap (Parallel on west side)	3.3	137.5	55.0	0.9	39.5	Lattice	
Meridian Tap-Meridian Substation (Parallel on north side)	2.6	157.5	49.6	0.7	41.8	Lattice	
	30.4		502.6	36.3	293.7		16,062,000
Option I: Medford 8asin (Existing Corridor)							
Ramsey Canyon-An Angle Point 3 miles from Table Rock (Replace Line 54)	4.8	75.0	43.6	0.7	27.9	Lattice	
An Angle point 3 miles from Table Rock Substation-Table Rock Substation (Replace with single pole)	3.0	50.0	18.1	0.4	6.7	Single Pole	
Table Rock Substation-White City Substation (Parallel on north side)	7.5	137.5	125.0	1.9	24.6	Lattice	
White City Substation-White City Rifle Range (Parallel within existing right-of-way)	3.0	0.0	0.0	0.4	0.0	Single Pole	
White City Rifle Range-Meridian Tap (Parallel on west side)	3.3	137.5	55.0	0.9	39.5	Lattice	
Meridian Tap-Meridian Substation (Parallel on north side)	2.6	157.5	49.6	0.7	41.8	Lattice	
	24.2		291.3	5.0	140.5		13,271,000
Option J - Rogue River Underwater Crossing							
New Corridor	1.8	50.0	10.9	2.6	7.0	Oil Filled Cable	6,892,000
Existing Corridor	1.0	50.0	6.0	0.2	2.0	Oil Filled Cable	4,865,000
Option K - Medford Basin Preferred Alternative, Ultimate Development							
(West Fork Evans Creek - Ramsey Canyon)							
New Alignment	3.8	300	138.2	10.1	51.5	Lattice	
Replace Line 54	0.5	200	12.1	0.1	3.0		
Ramsey Canyon - Meridian Substation (East Route)	27.0	300	981.8	63.6	357.6	Lattice	
	31.3		1132.1	73.8	412.1		15,636,000
Potential Future Requirements		--	--	8.5	412.1		
Option L - Medford Basin West Route Ultimate Development							
West Fork Evans Creek-Lyman Mountain							
new alignment	10.9	300.0	396.4	31.7	160.6	Lattice	
replace line 54	1.3	200.0	31.5	0.2	6.7	Lattice	
Lyman Mountain-White City Rifle Range (Parallel)	12.3	137.5	205.0	3.2	45.1	Lattice Obl Circuit	
White City Rifle Range-Meridian Tap (Parallel on west side)	3.3	262.5	55.0	0.9	39.5	Lattice	
Meridian Tap-Meridian Substation (Parallel on north side)	2.6	282.5	49.6	0.7	41.8	Lattice	
	30.4		737.5	36.7	293.7		22,382,000
Potential Future Requirements				5.4	260.6		
Option M - Medford Basin Ultimate Development Existing Corridor							
(West Fork Evans Creek-Ramsey Canyon)							
New Alignment	3.8	300	138.2	10.1	51.5	Lattice	
Replace Line 54	0.5	200	12.1	0.1	3.0		
Ramsey Canyon-An Angle Point 3 miles from Table Rock	4.8	200	116.4	0.7	27.9	Lattice	
An Angle Point 3 miles from Table Rock Substation-Table Rock Substation (Replace with double circuit)	3.0	75.0	27.3	0.4	6.7	Single Pole	
Table Rock Substation-White City Rifle Range (Parallel on south side)	10.5	137.5	175.0	2.7	24.6	Lattice Double Circuit	
White City Rifle Range-Meridian Tap (Parallel on west side)	3.3	262.5		0.9	39.5	Lattice	
Meridian Tap-Meridian Substation (Parallel on north side)	2.6	282.5		0.7	41.8	Lattice	
	28.5		469.0	15.6	195.0		21,159,000
Potential Future Requirements	--	--		4.3	218.8		

2/ Assumes that new alignment of the proposed route would be followed from West Fork Evans Creek to Junction with Medford 8asin West Route. It if is assumed that West Route ties into existing corridor (Option G) the new alignment portion (requiring a 175' right-of-way) would be 9.5 miles and the segment to be replaced would be 2.9 miles.

Lane-Twin Oaks

As indicated in Table 1-2, the agency preferred alternative would begin at Lane Substation and parallel the existing BPA 230 kV transmission line on the south side for 7.5 miles to a point near Twin Oaks, where the existing BPA 115 kV lines (from Eugene Substation) enter the 230 kV corridor. All switches and associated equipment would be located in the existing equipment yard at the BPA Lane Substation. BPA would construct this segment (Lane-Twin Oaks) of the line using its standard double circuit 500 kV tower design. A sketch of a typical BPA 500 kV transmission line tower, including a comparison to the existing BPA line, is shown in Figure 1-4.

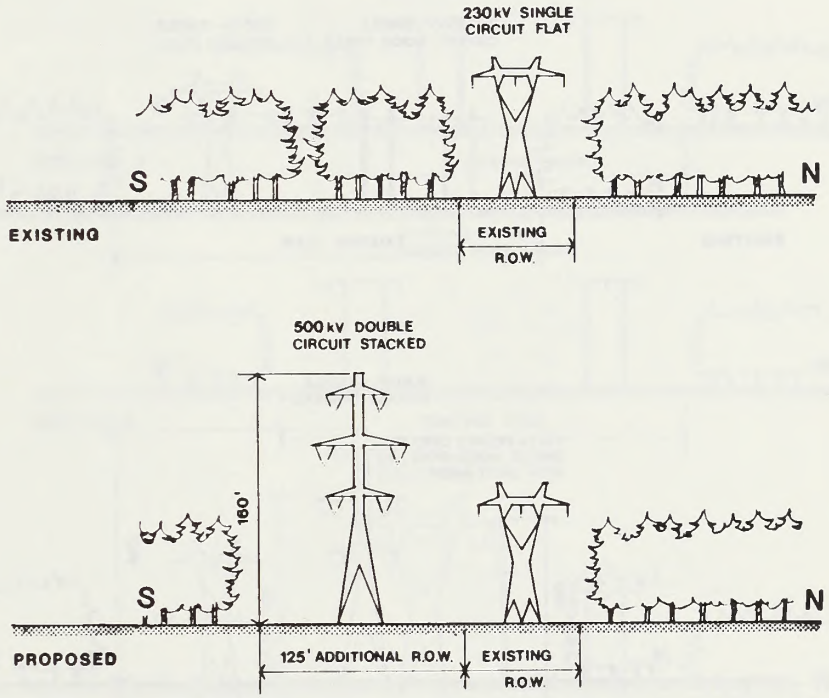


FIGURE 1-4 TYPICAL CORRIDORS IN THE LANE-TWIN OAKS SEGMENT OF PREFERRED ALTERNATIVE

Twin Oaks to Spencer

From Twin Oaks east to Spencer Switching Station, the two existing 115 kV lines would be removed and replaced by a single pole 115 kV double circuit line. The 115 kV circuits might be temporarily located on the 500 kV towers, but would eventually be supported on a double circuit single wood pole line with steel davit arms as shown in Figure 1-5. Construction of the double circuit 115kV line would be needed to allow sufficient room in the existing right-of-way to accommodate the new line. A double circuit 500 kV line would also be constructed in the existing right-of-way. This 4.0-mile corridor segment is shown under current and proposed conditions in Figure 1-5. All lines from Lane Substation to Spencer Switching Station would be constructed and operated by BPA.

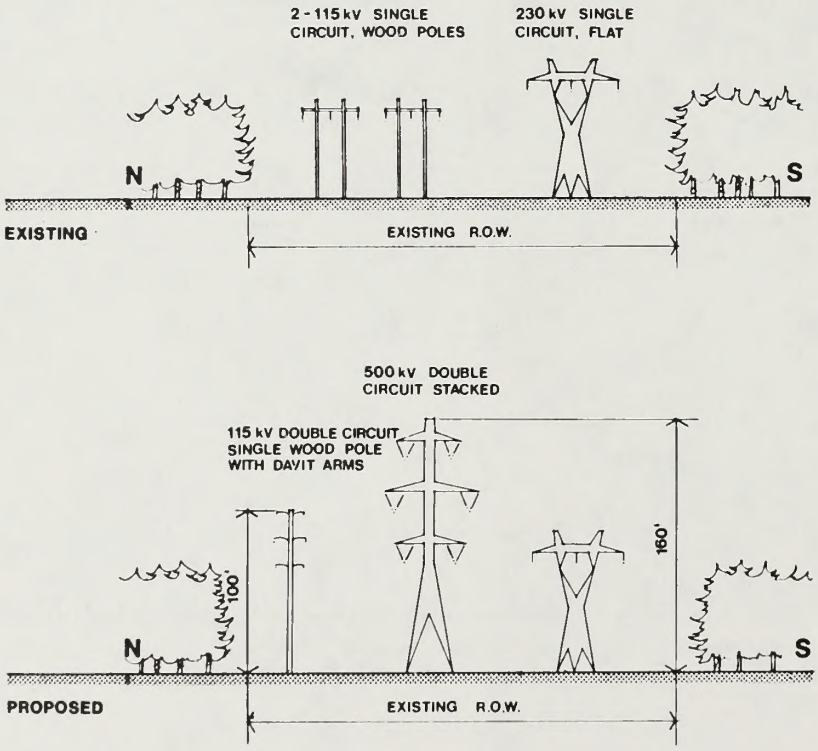


FIGURE 1-5 TYPICAL CORRIDORS IN THE TWIN OAKS-SPENCER SEGMENT OF PREFERRED ALTERNATIVE

Spencer Switching Station to Dixonville

From Spencer Switching Station south to Dixonville (a total of 58.6 miles), Pacific's existing Alvey-Dixonville 230 kV Transmission Line would be replaced by a single circuit 500 kV transmsission line constructed with towers such as the one shown in Figure 1-6. In this segment Pacific lines are supported by several types of structures on rights-of-way which vary considerably in width. Figure 1-6 presents existing conditions typical of the two most common cases.

The existing Dixonville Substation at the end of this segment would be modified with the addition of a 230 kV to 500 kV transformer bank and power circuit breakers. This development would be located on the existing substation property.

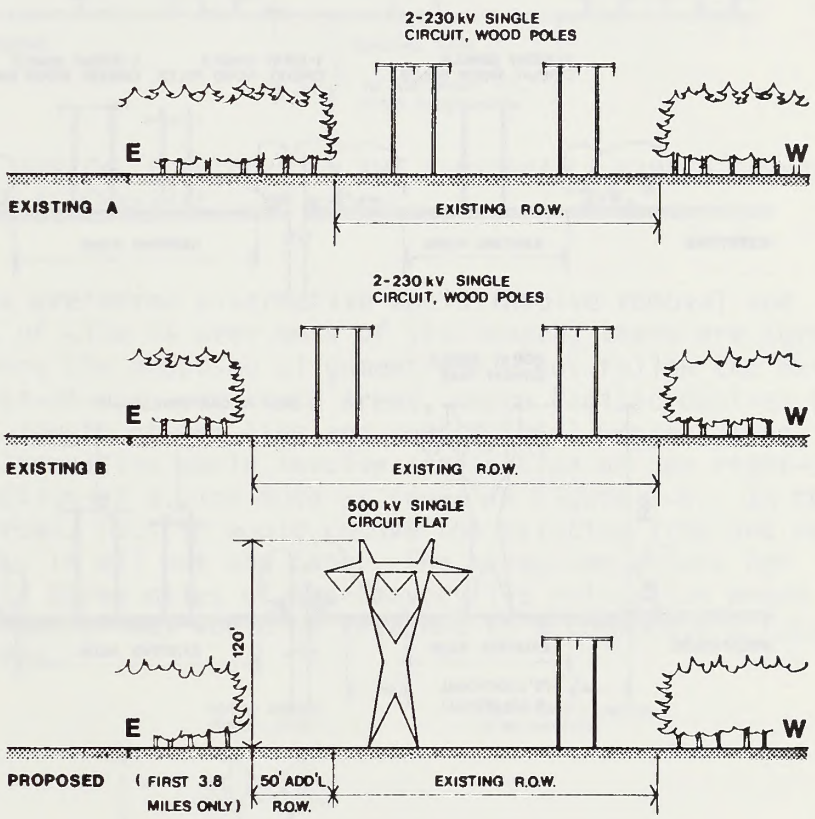


FIGURE 1-6 TYPICAL CORRIDORS IN THE SPENCER-DIXONVILLE SEGMENT OF PREFERRED ALTERNATIVE

Dixonville to Ramsey Canyon

From Dixonville to Ramsey Canyon, Pacific would construct a single circuit 500 kV transmission line on much of the right-of-way currently occupied by its Line 54, which would be removed to accommodate the new line. Typical conditions in this segment are shown in Figures 1-7 and 1-8. As shown in Figure 1-7, two other existing lines parallel Line 54 from Dixonville to the Canyonville area. From Canyonville south, Line 54 does not parallel other lines, as shown in Figure 1-8.

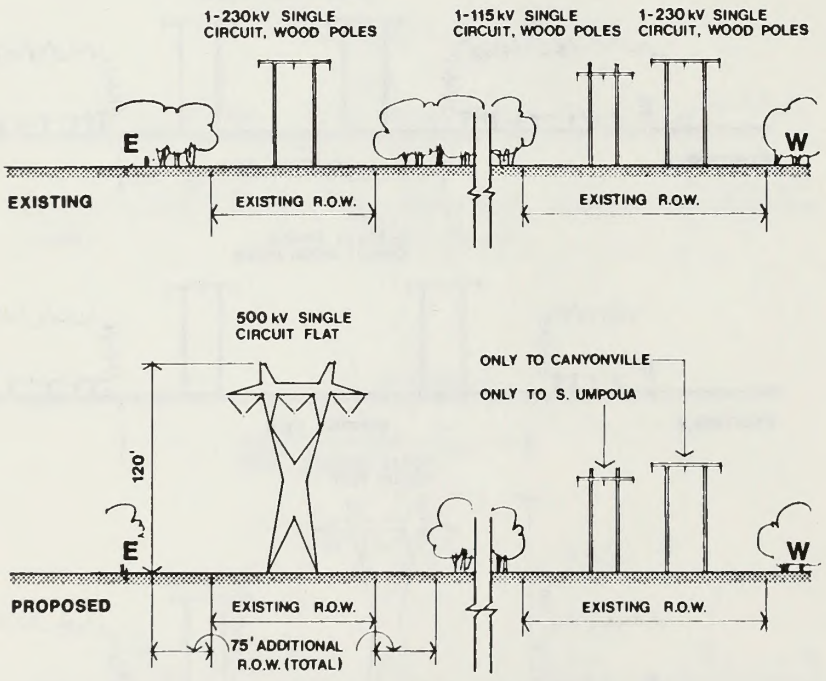


FIGURE 1-7 TYPICAL CORRIDORS IN THE DIXONVILLE-CANYONVILLE SECTION OF THE DIXONVILLE-RAMSEY CANYON SEGMENT OF PREFERRED ALTERNATIVE

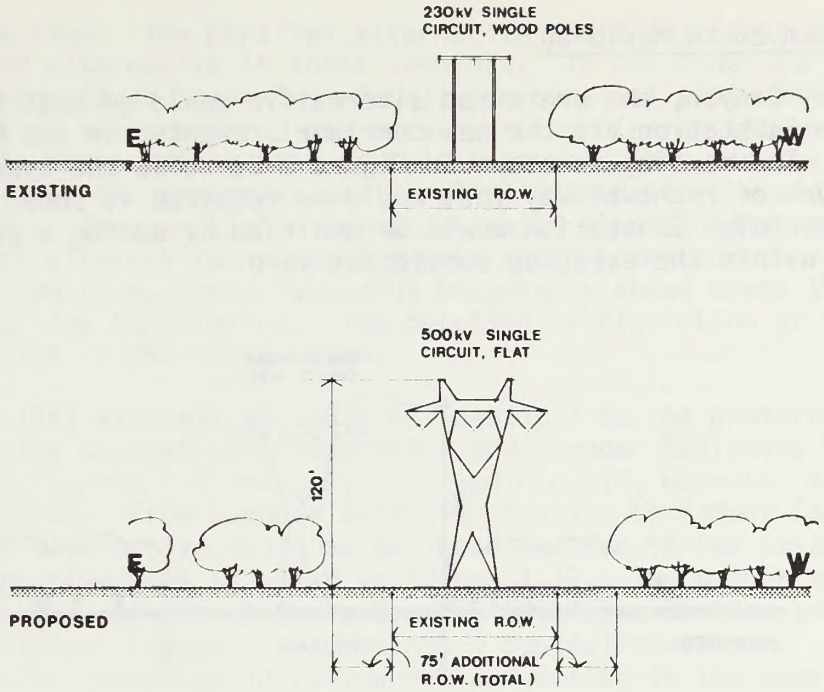


FIGURE 1-8 TYPICAL CORRIDORS IN THE CANYONVILLE-RAMSEY CANYON SECTION OF PREFERRED ALTERNATIVE

Although the preferred alternative would involve removal and replacement of Line 54 over most of its length, there are three segments where the proposed alignment would not follow the existing Line 54 right-of-way. In these areas, where Pacific desires to shorten the overall length of the line and reduce total project cost, the preferred alternative would involve acquisition of new right-of-way and the construction of a line such as shown in Figure 1-9. In these realigned areas, Pacific would remove the existing line and relinquish its easements in all but one case. The exception occurs for approximately three miles of the Canyonville relocation where the abandoned right-of-way would be retained to accommodate a future line to Grants Pass.

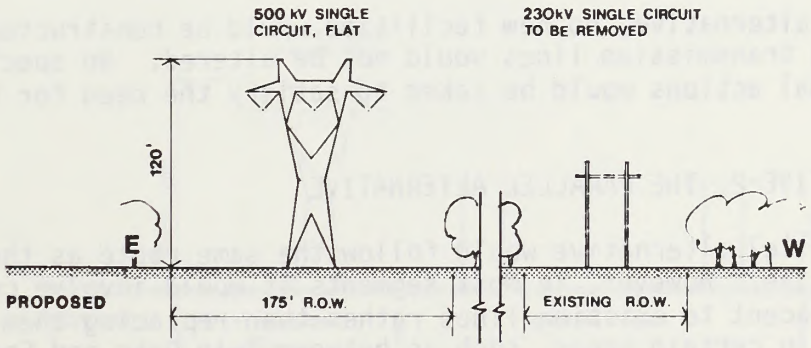


FIGURE 1-9 TYPICAL CORRIDOR IN THE REALIGNED PORTION OF THE DIXONVILLE-RAMSEY CANYON SEGMENT OF THE PREFERRED ALTERNATIVE

Ramsey Canyon to Meridian

At Ramsey Canyon, the preferred alternative would go east and south to Meridian Substation via the new corridor presented in the Routing Study Report. The routing is shown in Figure 1-2, while the type of tower and amount of right-of-way that would be required is shown in Figure 1-10. Meridian Substation would be modified by adding a power circuit breaker within the existing substation yard.

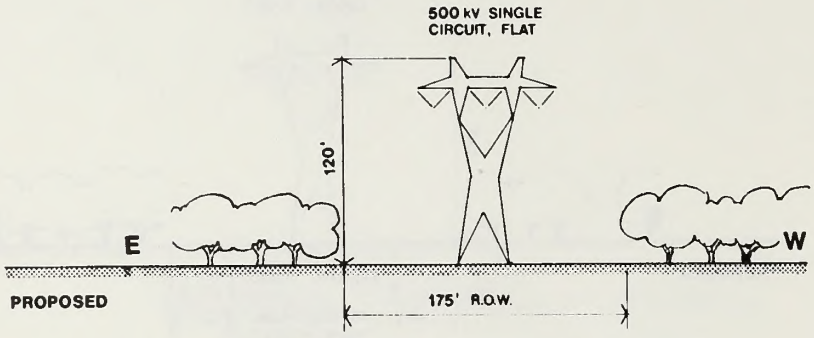


FIGURE 1-10 TYPICAL CORRIDOR IN THE RAMSEY CANYON-MERIDIAN SUBSTATION SEGMENT OF PREFERRED ALTERNATIVE

Summary of Preferred Alternative

As shown in Table 1-2, requirements for the preferred alternative would include construction of 146.8 miles of new transmission line, acquisition of approximately 1,323 acres of new right-of-way, and construction of 118 miles of access road at a total cost of $69,150,000. Pacific's portion would cost an estimated $57,250,000 while the BPA segments near Eugene would cost about $11,900,000.

ALTERNATIVE 1, THE NO-ACTION ALTERNATIVE

In this alternative, no new facilities would be constructed and the existing transmission lines would not be altered. No special or additional actions would be taken to satisfy the need for the proposal.

ALTERNATIVE 2, THE PARALLEL ALTERNATIVE

The parallel alternative would follow the same route as the preferred alternative. However, in most segments it would involve constructing a line adjacent to existing lines rather than replacing them with new lines. In certain areas, such as between Twin Oaks and Spencer Switching Station, paralleling the existing lines is considered infeasible because extensive development has occurred adjacent to the

existing line. The parallel alternative would be identical to the preferred alternative in these segments. In the other portion of the BPA section (i.e., Lane-Twin Oaks), the parallel alternative would be the same as the preferred one because the preferred alternative parallels the existing line in this segment. Thus, in the BPA portion of the line, the preferred and parallel alternatives would be identical. The parallel alternative would also be identical to the preferred alternative in the segments where a new corridor would be established (e.g. Green Mountain) because in these areas there is no existing line to parallel. The detailed configuration of the parallel alternative is described below.

The parallel alternative would be identical to the preferred alternative between Lane Substation and Spencer Switching Station, as shown in Figures 1-4 and 1-5. BPA would build, operate, and maintain this section. From Spencer Switching Station to Ramsey Canyon the parallel alternative would be on the east side of the existing line; a representative view is shown in Figure 1-11. The number of existing lines in the corridor between Spencer Switching Station and Ramsey Canyon varies; Figure 1-11 presents a typical condition. In addition, the parallel route would follow new alignments in the same areas as the preferred alternative, requiring new right-of-way as depicted in Figure 1-9. From Ramsey Canyon to Meridian, the parallel alternative would be identical to the preferred alternative.

The overall requirements of the parallel alternative include the need to acquire approximately 2,543 acres of right-of-way, construct 130 miles of access road, and clear 1,551 acres. The total cost would be $74,605,000, with the Pacific portion of the line representing $62,705,000 and BPA's portion being $11,900,000.

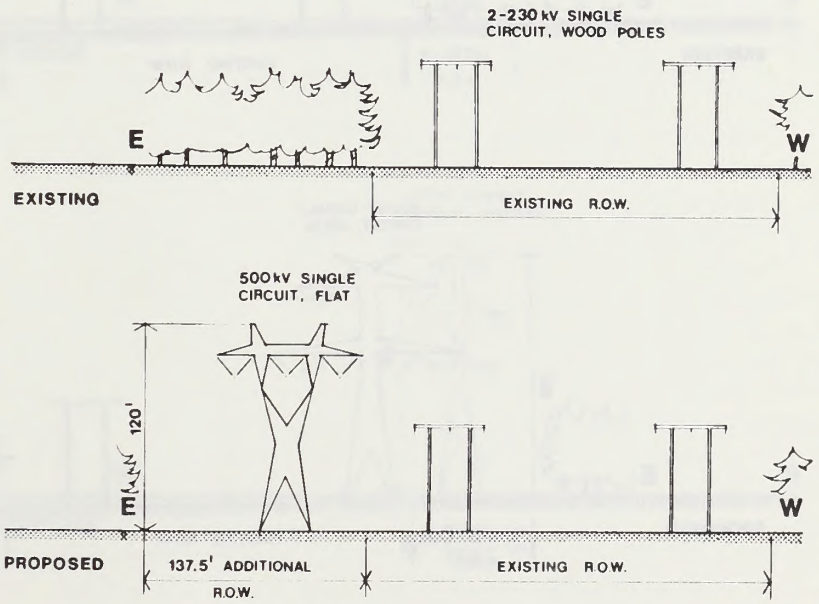


FIGURE 1-11 TYPICAL CORRIDORS IN THE SPENCER SWITCHING STATION-RAMSEY CANYON SEGMENT OF ALTERNATIVE 2 (PARALLEL)

ALTERNATIVE 3, DOUBLE CIRCUIT ALTERNATIVE

Alternative 3 would be the same as the preferred alternative except that double circuit towers, shown in Figure 1-12 or 1-13, would be used for most of the route. Figure 1-12 depicts a typical condition between Spencer and Ramsey Canyon, although as shown in Table 1-2, there would be variability along the route. A double circuit tower such as shown in Figure 1-5 would be used in the BPA portion of this alternative. The basic feature of this alternative would be towers that can support two 3-phase lines instead of only one 3-phase line. Use of these towers would modify other design parameters such as cost, reported in Table 1-2. A double circuit line would require the same or slightly less right-of-way than a single circuit line, as the greater height of the towers would allow a portion of the minimum conductor separation to be achieved in the vertical rather than horizontal plane. The double circuit alternative would facilitate installation of a second 500 kV line in the future without additional right-of-way acquisition.

In summary, the double circuit alternative would be similar to the preferred alternative except that Alternative 3 would use the tower shown in Figure 1-12 for the entire route. The overall requirements of the double-circuit alternative would include the need to acquire approximately 1,323 acres of right-of-way, construct 118 miles of access road, and clear 802 acres. The total cost of this alternative would be $121,689,000, including $109,689,000 for the portion south of Spencer to be built by Pacific.

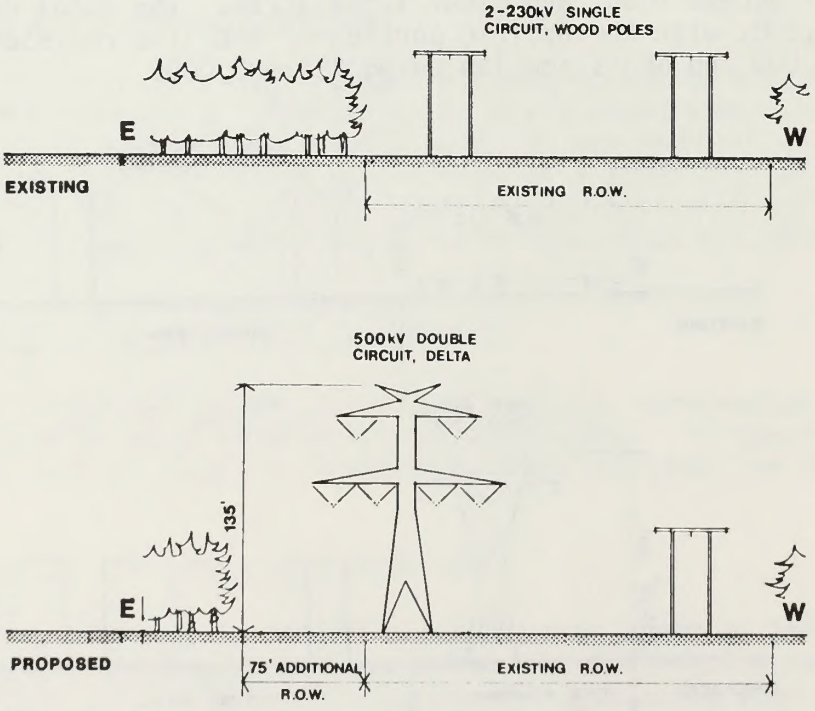


FIGURE 1-12 TYPICAL CORRIDORS IN THE SPENCER SWITCHING STATION-RAMSEY CANYON SEGMENT OF ALTERNATIVE 3 (DOUBLE CIRCUIT)

OPTIONS WITHIN ALTERNATIVES

Thirteen options, identified as A through M, could be employed along the route between Eugene and Medford, singly or in varying combinations. Each option is described below and compared briefly with the segment of the preferred alternative which it would replace.

Option A - Lane Substation - Twin Oaks (Replace Existing BPA Line With Double Circuit Line)

The preferred alternative would include construction of a double circuit line parallel to the existing line between Lane Substation and Twin Oaks. Option A would differ in that it would involve removing the existing 230 kV transmission line in this corridor and replacing it with a double circuit line as shown in Figure 1-13 (one circuit would initially be operated at 230 kV and the other at 500 kV). As in the preferred alternative, BPA would build, operate, and maintain the line in this option. This option, 7.5 miles long, would not affect the total length of the Eugene-Medford line, but would eliminate the need for additional right-of-way, as a double circuit line could be constructed on the existing 230 kV right-of-way. Option A would cost $6,900,000 as opposed to $7,300,000 for the preferred alternative in this segment. All switches and associated equipment will be located in the existing equipment yard at the BPA Lane Substation.

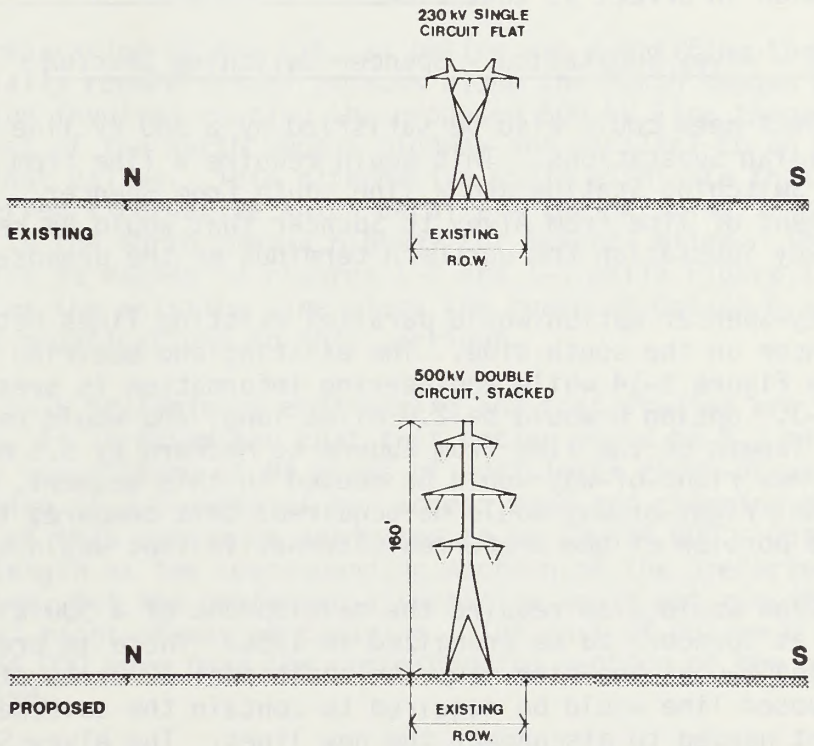


FIGURE 1-13 TYPICAL CORRIDORS FOR OPTION A (DOUBLE CIRCUIT LANE-TWIN OAKS)

Option B - Lane-Camas Swale (New Corridor)

This option was identified in the Routing Study Report completed earlier in this study. Its location is shown in Figure 1-1, while right-of-way and engineering information are presented in Table 1-3. It is assumed that a double circuit structure, as shown in Figure 1-13, would be used from Twin Oaks to Camas Swale, but this option would require a new right-of-way up to 175 feet wide. Overall, this 14.2 mile option would require 259 acres of new right-of-way, 18.3 miles of new access roads, and 133 acres of clearing at a cost of $11,930,000. Adoption of this option would reduce the overall line length by 2.1 miles and the total cost by $1,994,000 but would require approximately 130 additional acres of right-of-way.

To satisfy the future BPA plan to loop the Eugene area with a 500 kV transmission system, a new line would have to be constructed from Camas Swale to Alvey in the early 1990's. This 500 kV line could be located parallel to the existing right-of-way between Camas Swale and Alvey or on a new right-of-way between the two points. A switching station at Camas Swale would have to be constructed when the tie to Alvey is completed. The initial installation at the switching station would include three 500 kV power circuit breakers to terminate the 500 kV line to Dixonville, Lane, and Alvey Substations. These possible future developments, when firmly forecasted as a system addition, would be fully evaluated and addressed as required by the environmental legislation in effect at that time.

Option C - Alvey Substation - Spencer Switching Station

The project need could also be satisfied by a 500 kV line linking Alvey and Meridian Substations. This would require a line from Alvey to Spencer Switching Station and a line south from Spencer. Option C is the segment of line from Alvey to Spencer that would be required to make Alvey Substation the northern terminus of the proposed line.

The Alvey-Spencer option would parallel existing lines between Alvey and Spencer on the south side. The existing and modified corridors are shown in Figure 1-14 while engineering information is presented in Table 1-3. Option C would be 2.0 miles long, and would reduce the overall length of the line from Eugene to Medford by 9.5 miles. Because new right-of-way would be needed in this segment, 30 acres of additional right-of-way would be acquired; this compares to 114 acres for that portion of the preferred alternative that would be replaced.

This option would also require the development of a 500 kV switching station at Spencer, to be energized in 1986. There is presently a small line tap at the site now. An additional 12 acres of land under the proposed line would be required to contain the switches and other equipment needed to disconnect the new lines. The Alvey Substation yard is not large enough to accommodate this equipment, nor is there adequate room to allow for its expansion. The estimated cost of this option, excluding the switching station, is $3,010,000. This is $8,890,000 less than the portion of the preferred alternative that would not be expended at this time if this option is selected.

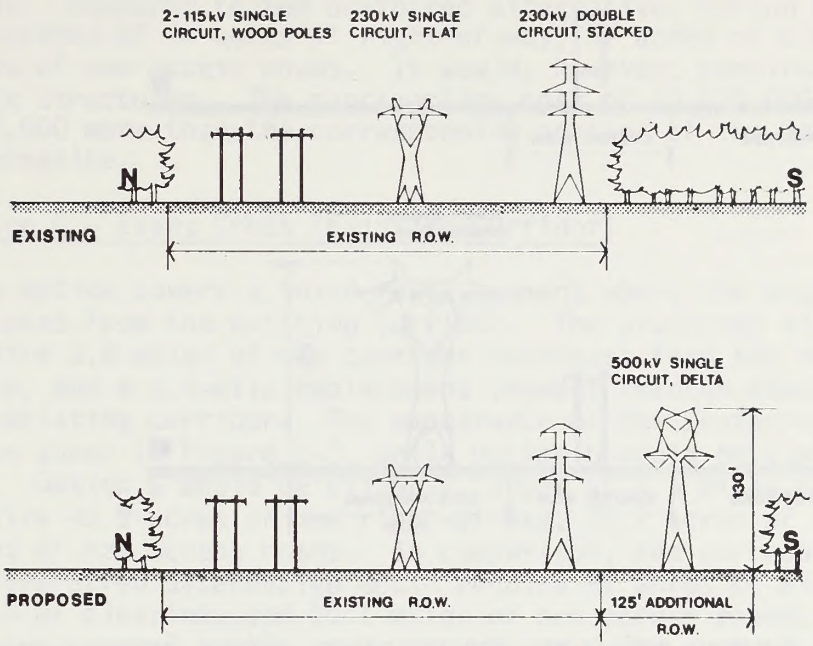


FIGURE 1-14 TYPICAL CORRIDORS FOR OPTION C (ALVEY-SPENCER)

Option D - North Umpqua Highway Bypass

During preparation of the EIS, an option was identified that would substantially reduce visual impacts along the North Umpqua Highway. This option involves routing the proposed 500 kV line through the valley east of the North Umpqua Highway and parallel to an existing line in that valley. This alternative would eliminate that portion of the preferred alternative which parallels the existing lines which are adjacent to the North Umpqua Highway for several miles. This alternative is mapped in Figures 1-2 and 1-3 while Figure 1-15 illustrates the existing line along the route of Option D and the potential modifications to this corridor.

Although only preliminary engineering and cost studies are complete at this time, it is estimated that this option would be 5.1 miles long, requiring acquisition of 96 acres of additional right-of-way, construction of 2.5 miles of new access road and clearing of 5 acres. The cost of this option is estimated to be $2,434,000. Option D would be same length as the corresponding section of the preferred alternative, but the preferred alternative would not require any additional right-of-way or clearing. The cost of Option D is estimated to be $464,000 more than the corresponding section of the preferred alternative.

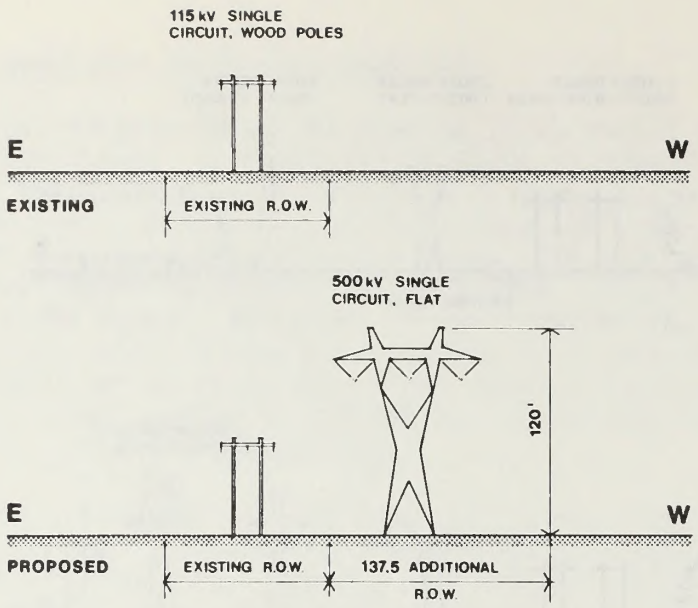


FIGURE 1-15 TYPICAL CORRIDORS FOR OPTION D (NORTH UMPQUA HIGHWAY BYPASS)

Option E - Canyonville (Existing Corridor)

Instead of deviating from the existing corridor near Canyonville as described for the preferred alternative, it would be possible to utilize the existing corridor. This option, replacing Line 54 near Canyonville, would be 4.2 miles long and would follow the route shown on Figure 1-3. It would be similar to the corridor depicted in Figure 1-8. It would require the acquisition of about 38 acres of additional right-of-way, construction of 0.8 miles of new access roads, and 22 acres of clearing. Option E would require the installation of several costly angle structures which increase the cost of this option substantially. The total cost of this option would be $2,323,000. As compared to the corresponding section of the preferred alternative, this option would be 1.5 miles longer and $921,000 more expensive. However, it would require 19 acres less new right-of-way, 19 fewer acres of clearing, and 7.3 fewer miles of roads.

Option F - Green Mountain (Existing Corridor)

Option F consists of an alignment along the existing corridor from just south of Cow Creek to Grave Creek, where the existing line skirts the western side of Green Mountain. The proposed and existing alignments in this area are mapped in Figure 1-3, while the configuration of the corridor for Option F would be similar to that shown in Figure 1-8. The total length of Option F would be 7.9 miles, compared to 6.9 miles for the section of new corridor in the preferred alternative which it would replace. This option would require 72 acres of additional right-of-way, 48 of which would be cleared, and 1.5 miles of new access

roads. Compared to the preferred alternative, Option F would represent reductions of 74 acres of right-of-way, 57 acres of clearing, and 19.2 miles of new access roads. It would, however, require several costly angle structures. The construction cost of $3,579,000 would be about $452,000 more than the corresponding portion of the preferred alternative.

Option G - Evans Creek (Existing Corridor)

This option covers a third route segment where the proposed alignment deviates from the existing corridor. The preferred alternative would require 3.8 miles of new corridor southeast from the West Fork of Evans Creek, and a 0.5-mile replacement segment through Ramsey Canyon along the existing corridor. The appearance of the preferred corridor would be as shown in Figure 1-9, while Option G would be similar to Figure 1-8. Option G would be slightly longer at 4.5 miles overall, and would require 40.9 acres of new right-of-way, 24.2 acres of clearing, and 0.7 miles of new access roads. In comparison, the corresponding segment of the preferred alternative would require 81 acres of right-of-way, 52 acres of clearing, and 10.1 miles of new access roads. It would also require several costly angle structures. The cost of Option G is estimated at $2,158,000, which is $159,000 more than for the proposed route segment.

Option H - Medford Basin - West Route

Option H is a routing alternative which could be employed to reduce impacts in the Sams Valley area. This option would consist of replacing Line 54 for 1.3 miles near the West Fork of Evans Creek, and developing 10.9 miles of new corridor from this point south along the ridge between Sams Valley and Sardine Creek to Lyman Mountain. These two corridor situations would be similar to those depicted in Figures 1-8 and 1-10, respectively. From Lyman Mountain, the route would parallel an existing 115 kV line (Line 40) for 1.8 miles eastward to Table Rock Switching Station, which is similar to the situation shown in Figure 1-15.

The remaining 16.4 miles from Table Rock to Meridian Substation is common to both Options H and I. The 500 kV line would require additional right-of-way parallel to existing lines, except for a 3-mile segment between White City Substation and the White City Rifle Range, where single pole structures would be used within the existing right-of-way. Figure 1-16 most closely represents the situation in the parallel sections, although the sizes and number of existing lines vary in places, while Figure 1-17 depicts the section where single poles would be used for the 500 kV line.

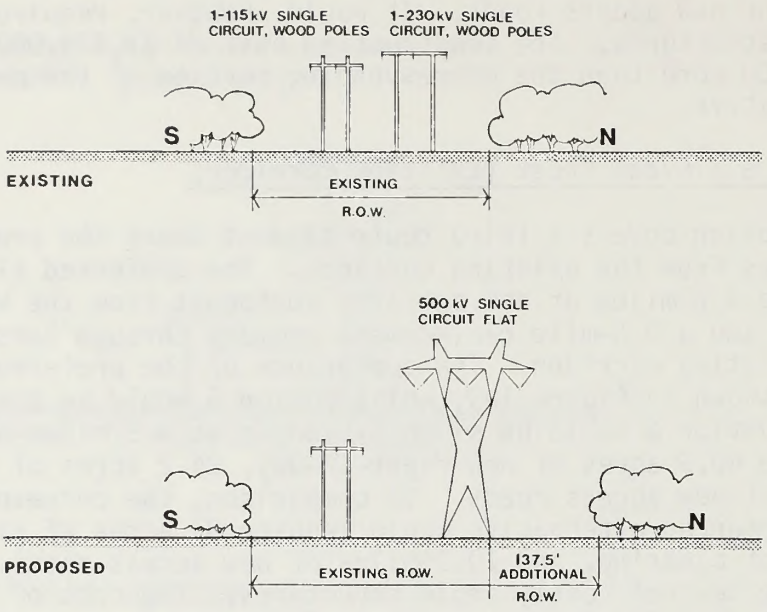


FIGURE 1-16 TYPICAL CORRIDORS FOR TABLE ROCK SWITCHING STATION - WHITE CITY SUBSTATION SECTION OF OPTIONS H AND I (MEDFORD BASIN WEST ROUTE AND EXISTING CORRIDOR)

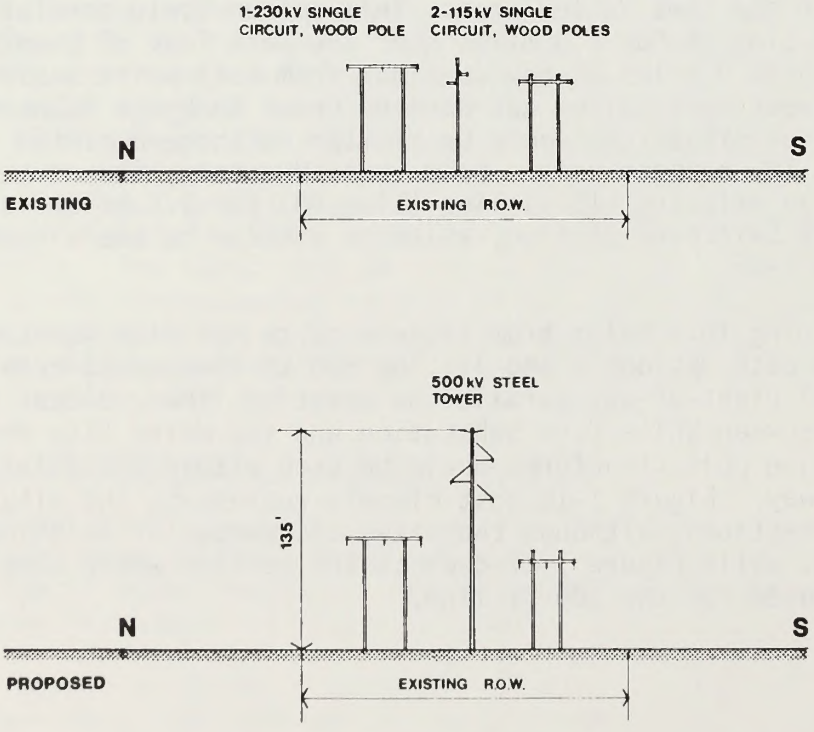


FIGURE 1-17 TYPICAL CORRIDORS FOR WHITE CITY SUBSTATION-WHITE CITY RIFLE RANGE SECTION OF OPTIONS H AND I (MEDFORD BASIN WEST ROUTE AND EXISTING CORRIDOR)

The west route option was identified in the Routing Study Report as an option which avoided Sams Valley, yet utilized the existing corridor through White City. The alignment of the corridor along the ridge between Sardine Creek and Sams Valley was defined to minimize visual impacts yet provide sound, stable support for a line on this steep ridge. Visual and geotechnical concerns, however, could not be fully resolved until a decision causes completion of survey and design activities.

Although the exact location of the west route depends on final engineering studies, geotechnical reconnaissance studies have indicated that towers can be located securely on the slopes above Sardine Creek (Ferris 1982). In these locations the towers would not be visible from most of Sams Valley. This finding is incorporated into the subsequent impact analysis although it must be recognized that precise tower locations might deviate slightly from the corridor shown in the Routing Study Report.

Engineering and cost information for Option H is included in Table 1-3. The total length of this option would be 30.4 miles, which would be 0.9 miles shorter than the proposed route from the West Fork of Evans Creek to Meridian Substation. Option H would require approximately 503 acres of additional right-of-way, or 155 acres less than the corresponding portion of the preferred alternative. This option would also require 33.6 miles of new access road and 284 acres of additional clearing. This represents 37 miles and 140 acres less, respectively, when compared to the proposed alternative. This option, however, would require several costly angle structures and would employ single pole structures (see Figure 1-17) which are much more costly than conventional lattice steel structures. This option would cost $16,062,000, or $1,156,000 more than the corresponding portion of the preferred alternative.

Option I - Medford Basin - Existing Corridor

The existing corridor through the Medford Basin could also be followed from Ramsey Canyon to Meridian Substation. This option would involve replacing Line 54 from Ramsey Canyon to Table Rock Switching Station, a distance of 7.8 miles. In the northern 4.8 miles of this section, the existing line would be replaced with steel lattice structures, as depicted in Figure 1-8. For the 3.0 miles immediately north of Table Rock Switching Station, however, single poles, shown in Figure 1-18, would be used. These poles would be used in this section (Sams Valley) because of congestion along the existing right-of-way.

From Table Rock Switching Station to Meridian Substation, Option I would be identical to Option H. In summary, Option I would be 27.3 miles long (from West Fork of Evans Creek), 2.8 miles shorter than the corresponding section of the preferred alternative. It would require about 351 acres of additional right-of-way, 12.0 miles of new access roads, and 183 acres of additional clearing. This is 281 acres of right-of-way, 58.6 miles of access roads, and 213 acres of clearing less than the preferred alternative. This option, like Option H, would require costly angle and single pole structures. The cost of Option I

is $13,271,000, while the cost of the corresponding section of the preferred alternative is $12,907,000. These costs cannot be directly compared with those of Option H because the origin of I (Ramsey Canyon) is several miles south of the point where Option H leaves the existing corridor. In the comparison section all Medford Basin alternatives are assumed to start at a common point (West Fork Evans Creek).

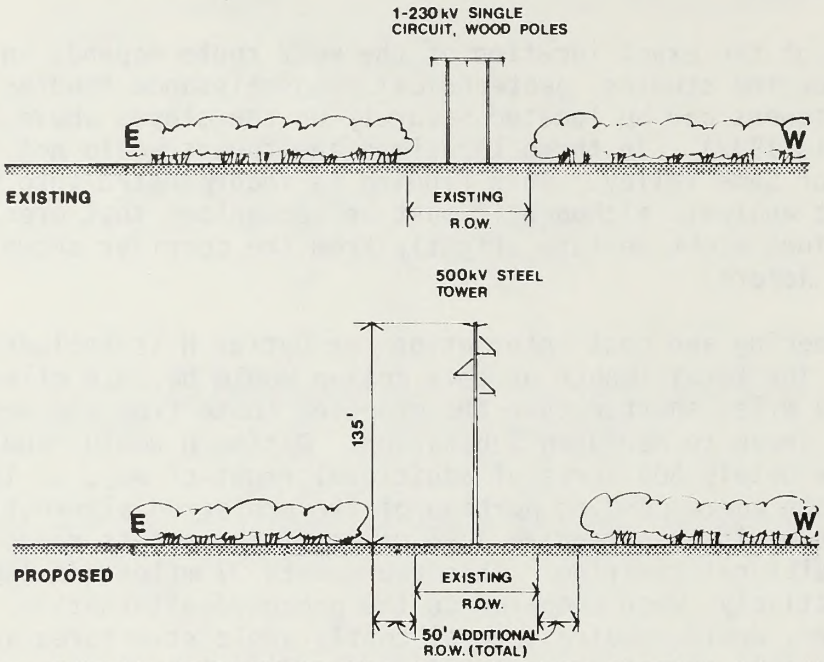


FIGURE 1-18 TYPICAL CORRIDORS FOR SAMS VALLEY PORTION OF RAMSEY CANYON-TABLE ROCK SWITCHING STATION SECTION OF OPTION I (MEDFORD BASIN EXISTING CORRIDOR)

Option J - Rogue River (Underwater Crossing)

Option J would consist of an underwater crossing of the Rogue River using buried cable, and could apply to the preferred alternative or to Options H or I. On the preferred (east) Medford Basin route, this option would require a 9,500-foot length of buried cable to avoid overhead line crossings of the Rogue River Road (west of the river), the river itself, and the Crater Lake Highway. The underground crossing would require 11 acres of new right-of-way, as opposed to 38 acres for the 1.8 miles of overhead line at this location of the preferred alternative. The cost of an underground crossing on the east route would be $6,892,000, resulting in a net increase in total project cost of about $6 million.

An underground crossing of the Rogue River along the existing corridor, as in Options H and I, would require 5,200 feet of buried cable. The required right-of-way area would be 6 acres, compared to 17 acres for an above-ground line. Total cost for this underground segment would be $4,865,000 which would increase the overall cost of the project by about $4.3 million.

The most prominent features associated with Option J would be the terminal structures to accommodate the transition between overhead and underground transmission modes. Typical drawings of these structures are shown in Figure 1-19.

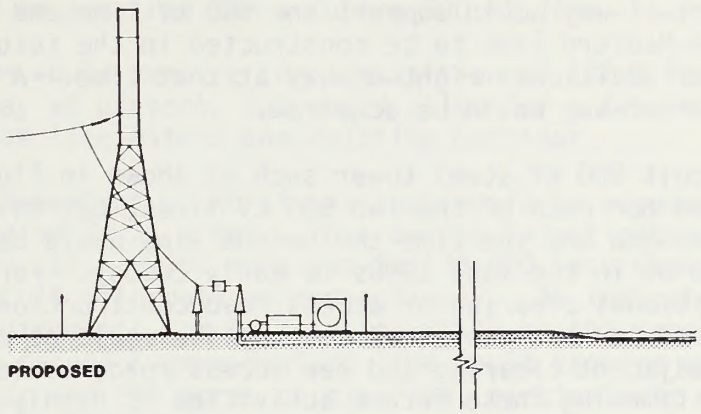


FIGURE 1-19 TYPICAL TERMINAL STRUCTURES FOR OPTION J (ROGUE RIVER UNDERWATER CROSSING)

Options K, L, and M - Medford Basin Ultimate Development Options

During the preparation of this Draft EIS it became apparent that a full comparison of options in the Medford area could not be undertaken without considering future transmission line requirements. The use of transmission line corridors for existing and future 500, 230, and 115 kV transmission lines warrants consideration so that these corridors can be optimally used in the future. As a result, three options have been identified which allow for long-term transmission requirements. These ultimate development options are designed to accommodate a future 500 kV transmission line if needed. Further, the ultimate development options using the existing corridor near Lower Table Rock and through White City would accommodate local transmission requirements as well as a future 500 kV line. Regardless of the route selected, however, Pacific estimates that an additional 50 feet of right-of-way would be required along the existing corridor to accommodate future 230 kV transmission requirements (Higgins 1982).

The manner of ultimate corridor development varies for each option in the Medford Basin, as described below. Options K, L, and M are the ultimate development options for the (east) preferred alternative, west, and existing corridors, respectively. All of these options, unlike Option I, begin at a common point (West Fork Evans Creek).

Option K - Medford Basin East Route Ultimate Development

The preferred alternative in the Medford Basin could be modified to accommodate future 500 kV transmission line development by acquiring a 300 foot easement for the new alignment portion, (30.8 miles) and a 200 foot easement for the half mile where Line 54 would be replaced. This width of right-of-way would support one 500 kV line and allow for a second Eugene-Medford line to be constructed in the future without the acquisition of additional right-of-way at that time. A total of 1132.1 acres of right-of-way would be acquired.

A single circuit 500 kV steel tower such as shown in Figure 1-10 would likely be used for each of the two 500 kV lines, but this design could change between now and the time the second line would be needed (estimated to be in the late 1990s to early 2000s). For the first line, no additional clearing or access road construction beyond the level described for the preferred alternative would be undertaken, in the future, adjacent clearing and new access roads would likely be required. Estimating these future activities is highly speculative because design and construction practices will probably change during the next twenty years. Because of this uncertainty, no sketches of the ultimate development are provided. Nevertheless, assumptions based on current practices can be used to project potential future access road and clearing requirements. It is thus estimated that up to 8.5 miles of new access road and 412 acres of clearing could be required at the time a second Eugene-Medford line would be built (see Table 1-3). These actitivies would be analyzed in detail prior to construction, in accordance with the laws at that time.

The cost of adopting this option, including the reserved right-of-way would be $15,636,000, or $730,000 more than the corresponding portion of the preferred alternative. It is approximately $11,122,000 less than the corresponding portion of the double circuit alternative.

Option L - Medford Basin West Route Ultimate Development

The ultimate development of the west route can be described in segments. Over most of the segment from West Fork Evans Creek to the junction of the West Route with the existing line near Lyman Mountain an easement for 300 feet of right-of-way would be obtained. This would accommodate two 500 kV lines although the second line would not be constructed until the 1990s or beyond, if required. Access road construction and clearing in this segment would be identical to Option H although additional road construction and clearing activity would likely occur with construction of the second line.

From Lyman Mountain, the new 500 kV line would parallel the existing 115 kV line on the north and east side for 4.7 miles past Table Rock Substation and across the Rogue River until the angle point south of the Medford Water Treatment Plant. Figure 1-20 shows typical corridors in this section. The new line would cross over the existing lines to the south side of the corridor at this point. It would then parallel

the existing lines through White City to the White City Rifle Range (also known as Medford Sports Park). Pacific would construct a single circuit line (and acquire an easement for a future line) south to Meridian Tap as shown in Figure 1-21. At Meridian Tap the line would cross the existing line again and parallel it on the north side to Meridian Substation. In this last segment of the route, an easement would also be acquired for a future 500 kV line.

This option would require the acquisition of 137.5 feet of additional right-of-way at present, but would allow for a future 500 kV transmission line within the existing corridor.

The total amount of right-of-way that would be required for this 30.4 mile option is 737.5 acres. This option is estimated to cost $22,582,000, $7,676,000 more and $4,176,000 less than the preferred and double circuit alternatives respectively. As indicated above, initial access requirements for this option would be the same as Option H, although a second Eugene-Medford line could require up to 5.4 miles of access roads and 261 acres of clearing, particularly near the northern and southern ends of the option.

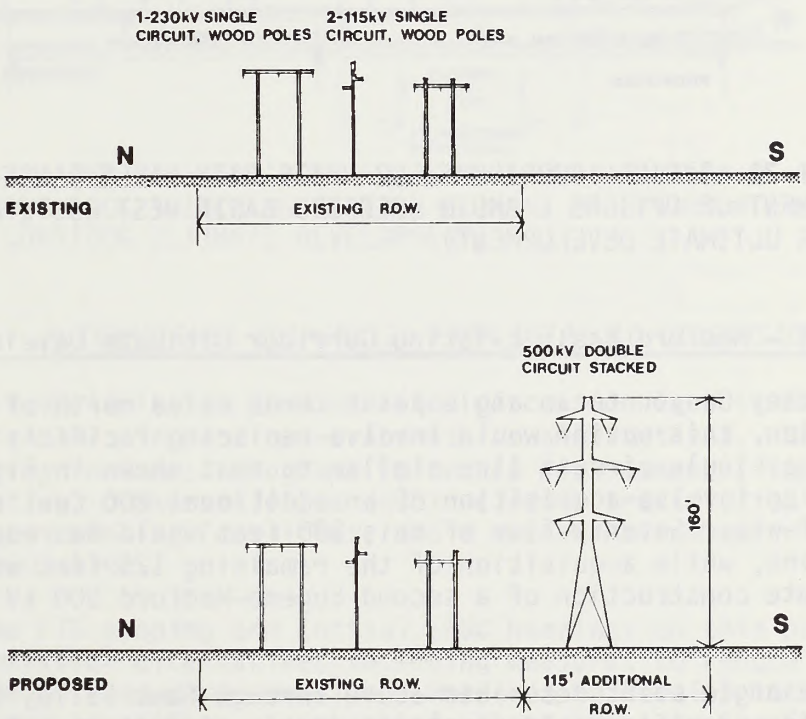


FIGURE 1-20 TYPICAL CORRIDORS FOR TABLE ROCK SWITCHING STATION-WHITE CITY RIFLE RANGE SECTION OF OPTIONS L AND M (MEDFORD BASIN WEST ROUTE AND EXISTING CORRIDOR ULTIMATE DEVELOPMENT)

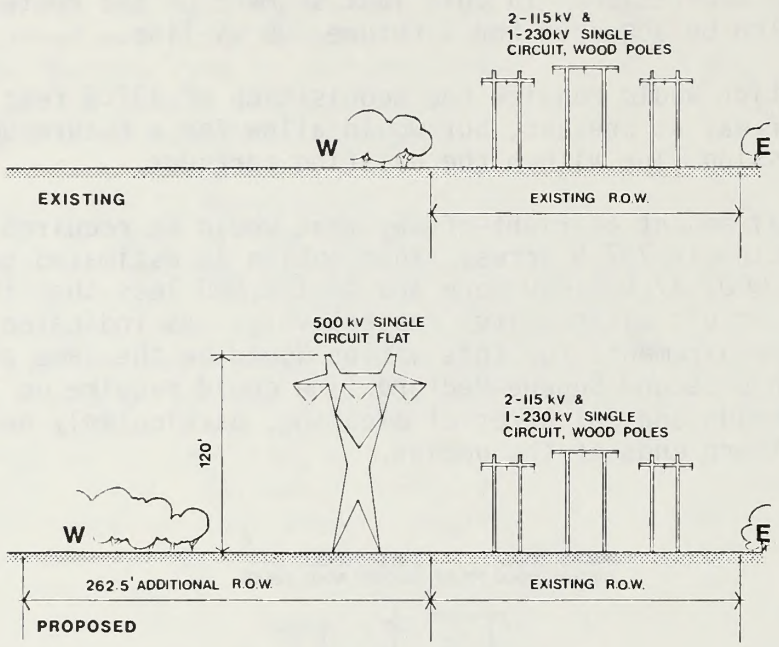


FIGURE 1-21 TYPICAL CORRIDORS FOR WHITE CITY RIFLE RANGE - MERIDIAN TAP SEGMENT OF OPTIONS L AND M (MEDFORD BASIN WEST ROUTE AND EXISTING CORRIDOR ULTIMATE DEVELOPMENT)

Option M - Medford Basin Existing Corridor Ultimate Development

From Ramsey Canyon to an angle point three miles north of Table Rock Substation, this option would involve replacing Pacific's existing Line 54 with a single circuit line similar to that shown in Figure 1-8. It would also involve acquisition of an additional 200 feet of right-of-way. Seventy-five of this 200 feet would be required for the first line, while acquisition of the remaining 125 feet would facilitate construction of a second Eugene-Medford 500 kV line in the future.

From the angle point described above through Sams Valley to Table Rock Substation, Pacific would construct double circuit structures to accommodate the proposed Eugene-Medford 500 kV line and the possible future line (see Figure 1-22). The actual width of new right-of-way to be acquired depends on the design of the double circuit structures selected, but in no case would it be more than 75 feet. From Table Rock Substation to Meridian Substation, Option M is identical to Option L.

Overall, this 28.5 mile option would require 469 acres of new right-of-way and 5 miles of new access. In addition, future development associated with a second Eugene-Medford line would require up to an additional 219 acres of clearing and 4.3 miles of access roads. It would cost $21,159,000, $6,253,000 more and $5,599,000 less than the corresponding portions of the preferred and double circuit alternatives respectively.

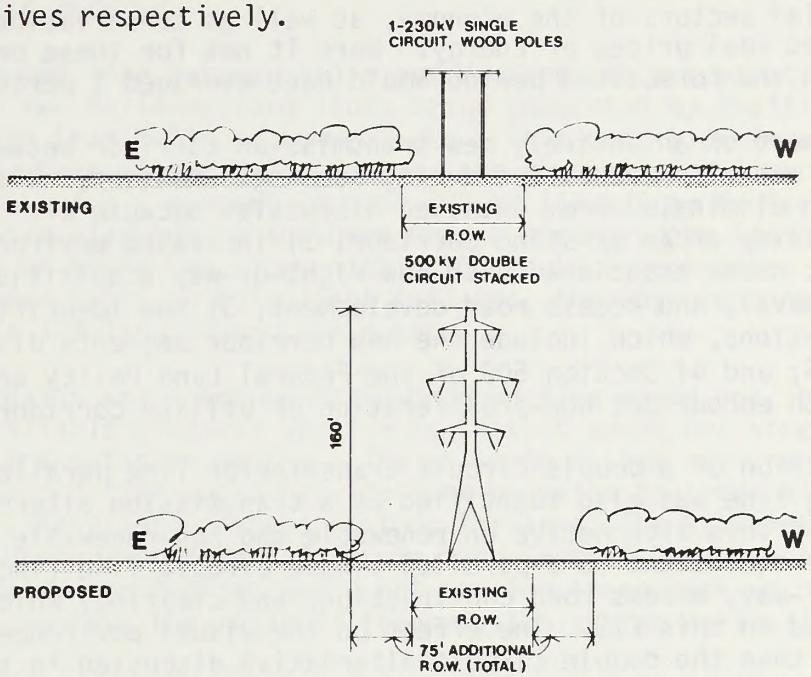


FIGURE 1-22 TYPICAL CORRIDORS FOR SAMS VALLEY PORTION OF RAMSEY CANYON-TABLE ROCK SWITCHING STATION SEGMENT OF OPTION M (MEDFORD BASIN EXISTING CORRIDOR ULTIMATE DEVELOPMENT)

ALTERNATIVES ELIMINATED FROM DETAILED DISCUSSION

Alternatives eliminated from detailed discussion in this EIS include several transmission and non-transmission alternatives. Such alternatives include: programs to reduce peak demands, local sources of generation, conservation, a double-circuit transmission line parallel to existing facilities, and a second Malin-Medford transmission line.

During the EIS scoping and initial EFSC hearings on this project, non-transmission alternatives including measures to reduce peak load demands (e.g. load management) and measures to develop local generation sources were identified as potential alternatives to the Eugene-Medford 500 kV transmission line. These non-transmission alternatives, including cogeneration, were determined to be insufficient to satisfy the need for this project by the EFSC (see Hearing Officer's Report and Recommendation and OAR 345-080-052).

Conservation was also identified as a potential alternative to the proposed project, but it was also determined to be insufficient to reduce energy demands by the magnitude required to eliminate the need for the proposed project. The forecasts compiled by Pacific and summarized in the discussion of the project's Purpose and Need include energy conservation measures in the residential, commercial, and industrial sectors of the economy, as well as conservation induced by increased real prices of energy. Were it not for these programs, peak loads in the forecasted period would have averaged 5 percent higher.

Development of an entirely new transmission corridor between Eugene and Medford was also identified during scoping. However, this alternative has been eliminated from detailed discussion because of: 1) the availability of an existing corridor; 2) increased environmental and economic costs associated with new right-of-way acquisition, increased tree removal, and access road development; 3) the identification of other options, which include the new corridor segments discussed in this EIS; and 4) Section 503 of the Federal Land Policy and Management Act which encourages non-proliferation of utility corridors.

Construction of a double circuit transmission line parallel to the existing line was also identified as a transmission alternative. The effect of this alternative on renewable and non-renewable resources would be equivalent to a parallel single circuit line (increased right-of-way, access road construction, and clearing) which is discussed in this EIS. The effect on the visual environment would be greater than the double circuit alternative discussed in this EIS because existing lines would remain if a parallel double circuit line were to be built. The combined effect of a double circuit line parallel to existing lines on the physical and visual environment would be significantly greater than the other alternatives discussed in this EIS. Consequently, this alternative is not discussed further.

A second 500 kV transmission line between Malin and Medford, Oregon was also identified during the BLM and EFSC hearings as an alternative to a line from Eugene to Medford. Since these meetings, it has been determined that a second Malin-Medford line would not by itself meet the electrical needs of southern Oregon and northern California, nor improve the reliability of the regional transmission system.

There are two sets of reasons why the Malin-Medford alternative has been eliminated from detailed analysis. The first set relates to its ability to satisfy the project need as defined earlier and the second set relates to the line's environmental impact.

From a transmission planning standpoint, there is insufficient transmission capacity available into Malin from the north or east to make the Malin-Medford option viable because the existing lines serving Malin from the north and east are committed to other uses. The most important use, as it relates to this project, is as part of the Pacific Northwest-Southwest AC Intertie (see Glossary). BPA was authorized by Congress to construct a major portion of the north end of the Intertie facilities to provide for the exchange of electric power between the

Northwest and Southwest. This authorization did not include use of the 500 kV facilities for service to local loads. Based on this authority, the priority for use of these facilities restricts availability of transmission capability to serve loads in southwest Oregon. As a consequence, Pacific is obligated to separate its 500 kV lines from the Northwest-Southwest Intertie at Malin when scheduling capability on the Intertie is reduced.

With a second line between Malin and Medford, this separation would result in two Malin-Medford lines being supported by Pacific's single 500 kV line from Malin to Summer Lake. This condition is unacceptable since an outage of the Malin-Summer Lake transmission line would result in the loss of all support to both 500 kV lines into Medford, causing an extensive blackout in southern Oregon and northern California. The existence of these two lines within 150 feet of each other would also expose these lines to coincident failures, thereby creating the same results as a Malin-Summer Lake outage.

Another reason why a second Malin-Medford line would not, by itself, provide reliable electric service is that it would not strengthen the existing transmission system. The existing system and proposed Eugene-Medford line would provide back-up paths to serve all major load centers. These load centers include Portland, the Willamette Valley, southern Oregon/northern California, and Central Oregon. A second line between Malin and Medford would not provide these back-up paths and so would not improve the regional transmission system reliability.

Therefore, to meet the needs of the proposed project, the Malin-Medford alternative would also require construction of a second Malin-Summer Lake 500 kV line (75 miles in length) and additional development at the Summer Lake Substation. It would also require construction of the 58 mile Eugene-Dixonville section of the proposed project or expansion of the existing 230 kV system initialy and again at a later date. The total cost of a second Malin-Medford 500 kV transmission line would exceed $119,000,000.

If the full extent of the Malin-Medford alternative is considered, the second set of reasons for eliminating it from detailed analysis in this EIS becomes apparent. The reasons relate to environmental impacts, which would be greater than for a Eugene-Medford line. The Malin-Medford alternative (including a second Malin-Summer Lake line and a Eugene-Dixonville line) would require over 220 miles of new transmission line, approximately 70 miles more than the preferred alternative. It would also require over 2600 acres of additional right-of-way, approximately twice as much as the preferred alternative. Although this line would not impact the Medford Basin, it would affect the northern part of the study area evaluated in this EIS and would have significant impacts in the Klamath Basin, both on residential and agricultural land use.

STANDARD DESIGN FEATURES

Information on project engineering considerations is found in the Pacific Power and Light Company Site Certificate Application to the State of Oregon Energy Facility Siting Council (Pacific 1981a). That application identifies design characteristics of the proposed transmission line. The proposed transmission line would be supported on steel towers, designed in conformance with the standards of the National Electric Safety Code. For a single circuit line, three 3-bundled conductors would be used. Each 3-bundled conductor carries 1 phase of the three phase AC single-circuit line. The towers would typically be 120 feet tall and weigh approximately 17,000 pounds. One foundation is required for each tower leg. In most sites each foundation would consist of a poured-in-place concrete pier footing averaging three feet in diameter and 14 feet in depth. Holes for these foundations would be excavated by auguring. Rock anchors would be installed in bedrock areas, and some blasting might be necessary in areas of fractured bedrock. Double circuit lines would consist of two sets of three-phase AC overhead conductors. Double circuit towers are typically 160 feet tall and weigh about 40,000 pounds.

Minimum conductor ground clearances would be maintained, including the standard clearance of 38 feet in most areas, 45 feet in areas where highways are crossed, 42 feet above cultivated land, and 55 feet above all railroad crossings. The average span length would be approximately 1200 feet, with an average of 4.3 structures per mile. Small diameter (less than one inch) wires would also be strung on the top of all towers. These overhead ground wires shield the line from lightning strikes providing protection to the transmission system.

Towers and conductors would be located and designed to minimize visual impacts. Careful tower siting, clearing, and establishment of buffer strips would be undertaken to lower impacts. Both the BLM and EFSC, or other agencies designated by EFSC would have the authority to review design studies and specify project changes. Non-reflective conductors would be used between Spencer Switching Station and Canyonville and in the Medford Basin. Towers near the North Umpqua River and Highway, and in the Medford Basin would be treated to dull the finish of the steel. The project would also include designation of a special vegetation management zone near the selected Rogue River crossing. In this zone a vegetation planting program would be employed which would lead to establishment of a vegetation screen of native shrubs along the river bank.

The transmission line would be located within a right-of-way for which an easement or title would be owned by either BPA (in the sections west or east of Spencer Switching Station) or Pacific (for those sections from Spencer Switching Station south to Medford). Ownership of these rights-of-way would be accomplished through the acquisition of new easements or the utilization of existing rights-of-way currently held by BPA and Pacific. Up to 175 feet of right-of-way would be obtained in areas where a new right-of-way is required. In areas where the

proposed line would parallel or replace an existing line, additional right-of-way requirements would range from 0 to 175 feet as reported in Tables 1-2 and 1-3.

In the new alignment areas of the preferred and other alternatives between Canyonville and Ramsey Canyon (Canyonville, Green Mountain, and West Fork Evans Creek) described earlier, Pacific would remove Line 54 and construct the new line on a new right-of-way. On the sections of the existing line replaced by the Green Mountain and West Fork Evans Creek segments, Pacific would relinquish its easement on abandoned rights-of-way allowing them to be used for forestry or other purposes. Easements would also be relinquished on all but the first two miles of the existing corridor to be replaced by the Canyonville re-route. The easement would be retained in the first two-mile segment to accommodate a future line to Grants Pass.

Surface access to each tower is normally provided by both BPA and Pacific. Existing access could be utilized in large part for those segments of alternatives which parallel or replace existing lines. In other areas, new access roads would be constructed to provide access to tower sites. New access requirements would range from 150 feet per mile to over 3 miles of access road per mile of transmission line depending on the existing road network, topography, and the location of individual towers. A large, but presently unknown portion of the existing road network would require upgrading. This would involve clearing overgrown vegetation and regrading. Generally, the access roads would have a 14-foot wide subgrade.

CONSTRUCTION

Transmission line construction activities are described in the Pacific Power and Light Site Certificate Application (Pacific 1981a) and BPA programmatic environmental impact statements (USDOE BPA 1980a; USDI BPA 1977b). These activities would include clearing, access construction, tower assembly, erection, conductor stringing, and tensioning. All involve the operation of heavy equipment. Site restoration activities which occur following construction include scarification, reseeding, weed control, and other activities as required.

Clearing affects more acreage than other construction activities. The intent behind BPA's and Pacific's vegetation management programs would be to allow as much vegetation to remain on the right-of-way as possible. The extent of vegetation remaining would depend on the type of plants present, their current and projected heights and the distances needed to maintain safe clearances as defined by the National Electric Safety Code. These factors would be analyzed prior to clearing activities to identify only that vegetation which need be removed. Although the exact clearing procedures would vary somewhat, each utility would remove only that vegetation which would pose a threat to the transmission line. For example, clearing would be minimal in areas of low growing shrubs. Clearing would be much more extensive in areas of large old growth timber, as trees further from

the line could potentially fall into the transmission line towers or conductors. For the purpose of analyzing impacts in this EIS it is assumed that the average clearing width on a 175-foot right-of-way would be a 125 foot wide strip.

Both BPA and Pacific have identified specific actions that would be implemented to reduce construction impacts. BPA has incorporated measures designed to maintain environmental quality into its construction specifications (USDOE BPA 1978). Standard design techniques such as installing gates in cooperation with affected landowners and noise control in residential areas are included in these specifications. These gates are also used in limiting access during the line's operation. Activities to minimize environmental impacts have also been identified for the portion of the line that would be constructed by Pacific and are presented in Appendix A. Appendix A includes letters from Pacific to the Bureau of Land Management outlining specific activities it would undertake on federal land. In accordance with conditions which would be specified by the Energy Facility Siting Council, similar measures would be employed on non-federal land.

The proposed project would include measures to minimize impacts in specific locations and during certain periods of the year. For example, construction activities would not occur when weather or other conditions increase potential environmental impacts to unacceptable levels as determined by BLM and designated Oregon State agencies. Such conditions could arise during heavy rains or when the ground is thawing. To prevent impacts during such periods, BLM would restrict construction activities on lands it manages. Conditions in EFSC's site certificate and other state laws would give EFSC and other state agencies the authority to restrict construction on state and private lands during the same periods.

MAINTENANCE

Transmission right-of-way maintenance would require periodic control of tall vegetation so that it will not fall into conductors or otherwise interfere with the operation of the line, while encouraging or promoting the growth of low growing species of vegetation. Additional information on Pacific's vegetation management program is presented in the pamphlet entitled, "Pacific Power and Light Company Policy on Transmission Line Rights-of-Way." BPA practices are described in the Environmental Assessment on BPA's Fiscal Year 1982 Vegetation Management Program (USDOE BPA 1981a) and the Fiscal Year 1981 Program EIS (USDOE BPA 1980a).

Use of herbicides would be an integral part of both Pacific's and BPA's vegetation management programs on rights-of-way. The underlying need of the management program would be to ensure reliable continued service of the transmission system. Various techniques would be utilized to control or eliminate vegetation growing within or adjacent to

transmission facilities that could interfere with reliable service. These techniques would include hand and mechanical cutting of vegetation as well as the selective and, in the case of BPA, aerial application of herbicides. In areas where herbicides would be used, applications would occur at approximately 10-year intervals.

The methods employed would depend on a number of site-specific variables. Consideration would be given to the management objective, type of vegetation present, adjacent land use and development, and impacts of the control technique when selecting the most appropriate method to employ at a specific facility or right-of-way segment.

In a substation yard where access would be restricted, the hazard of exposure to humans would be minimal and the objective would be to eliminate all vegetation, a herbicide would be used. On rights-of way, where the greatest selectivity would be desired, handcutting of specific trees and stump treatment would likely be utilized. On rights-of way where selectivity would still be desirable, access would not be a problem and herbicide use would present little hazard, selective means of herbicide application such as foliage, basal and soil treatment, as well as the frill, notch and cup methods would likely be employed. Finally, on rights-of-way where selectivity would not be a factor, access would be a problem, and herbicide use would present little hazard, BPA might consider aerial application of herbicides to be appropriate. Aerial spraying is usually done on areas with few roads or where control of uniform stands of conifers or other tall vegetation makes selectivity unnecessary. This flexibility in vegetation management would introduce a minimal amount of herbicides into the environment and greatly reduce the potential for hazardous exposure.

When herbicides would be employed, they would be applied under close supervision. Where applied by contractors, BPA or Pacific inspection would be exercised. All herbicides would be applied at rates specified on the product label except where rates lower than specified have proven effective. Rates higher than those specified on the product label would never be used. All Pacific and BPA applications (whether undertaken by themselves or by contractors) would be conducted or under the supervision of applicators licensed by the State of Oregon. Pacific and BPA would also coordinate closely with agencies responsible for herbicide use, such as the State of Oregon Pesticide Use Clearinghouse. Only herbicides registered with the Environmental Protection Agency (EPA) would be used.

If a landowner objects to Pacific or BPA vegetation management methods, either organization may join in a Tree and Brush Agreement allowing the owner to assume responsibility for the vegetation on the right-of-way. Benefits associated with such an agreement and the multiple use of Pacific and BPA rights-of-way are: (1) more productive use of the right-of-way land, (2) reduction of maintenance costs and time, and (3) reduction of herbicide use.

The use of certain chemicals would be controlled under the Federal Insecticide, Fungicide and Rodenticide Act. The EPA sets regulations for enforcement of this act (40 CFR, Part 162), as well as acceptance of certain pesticides and their use, storage, and disposal (40 CFR, Part 165). In addition, EPA sets protection standards for workers handling such pesticides (40 CFR, Part 170). Both BPA and Pacific would comply with all regulations pertaining to insecticides, fungicides, and rodenticides used in its construction and maintenance activities. Chapter V of the BPA Right-of-Way Management Standards (No. 63040-50) details the various procedures and practices used by BPA in order to comply with various federal regulations. A detailed discussion of herbicide and pesticide use by BPA is contained in the Fiscal Year 1981 Program EIS (USDOE BPA 1980a). All herbicide use on lands administered by BLM is subject to prior approval by BLM.

COMPARISON OF ALTERNATIVES

The alternatives and options are compared in relation to two sets of parameters. First, the success of each alternative in achieving the purpose of the project at a reasonable cost is assessed. Second, the environmental impacts of the alternatives and options are compared. The evaluations are made by comparing all of the alternatives to each other, while options are evaluated by comparing each option to the corresponding portion of the preferred alternative or other alternatives, where appropriate. Chapter 3 provides more detailed information on comparisons made in this chapter.

PROJECT INTENT

As described in the discussion of Purpose and Need, the proposed Pacific Eugene-Medford 500 kV transmission line is intended to serve anticipated loads in southwestern Oregon and northern California while also improving the reliability of the transmission system.

Effective project planning requires anticipating future needs and making decisions accordingly. One such consideration relates to the requirement for a second Eugene-Medford 500 kV line. Both BPA (Perry 1981) and Pacific (Higgins 1981a) have indicated that a second Eugene-Medford 500 kV line may be required. Considerable uncertainty surrounds the timing for this line, however. BPA indicates that this line would be required for the 1990s while Pacific believes it would not be required until after the year 2000. The timing for this line depends on factors which are difficult to predict, such as future load growth and development of future generation resources. Regardless of when the second Eugene-Medford line is required, its possible routing is an important consideration in evaluating the alternatives and options for the first Eugene-Medford 500 kV line.

As to the BPA activities between Lane and Spencer, a double circuit, 500 kV configuration is being proposed, regardless of the alternatives considered by Pacific. Two circuits on one tower would reduce the need, sometimes completely, for any new right-of-way on the Bonneville alignment. This is especially a concern between the Twin Oaks and Spencer areas where extensive development has taken place adjacent to the existing right-of-way. Although some new right-of-way is required between Twin Oaks and Lane, the proposed configuration would allow for more efficient utilization of the corridor in the future.

Also related to the requirement for a second line from Eugene to Medford is the goal of planning for and using transmission line corridors as efficiently as possible. This goal is shared by BLM as mandated in the Federal Land Policy and Management Act (Sec. 503), BPA as stated in its Role EIS (USDI BPA 1977a), and by the State of Oregon through its Statewide Planning Goals and Guidelines. Thus, the potential use of existing and designated corridors for future transmission lines is a factor to consider in evaluating transmission line corridors.

Alternatives

The preferred, parallel, and double circuit alternatives would satisfy the purpose and needs identified on page 1-1. There are, however, differences between these alternatives related to the extent each alternative achieves the project's purpose.

Preferred Alternative: The preferred alternative would adequately meet the project's need, although it would not fully satisfy all projected long-term requirements. If this line is constructed, there could likely be a need for a second Eugene-Medford 500 kV line in the future. Perry (1981) estimates this second Eugene-Medford line would be needed in the 1990s, but this conclusion is uncertain . This alternative satisfies all the project's needs and is estimated to cost approximately $69.2 million, less than the parallel or double circuit alternatives.

In the longer term, replacing the existing line (Line 54) between Canyonville and Ramsey Canyon does not allow for future transmission line development within existing rights-of-way. As compared to the segment between Spencer Switching Station and Canyonville where the proposed line would replace one of two existing transmission lines, in the segment from Canyonville to Ramsey Canyon the only existing line would be replaced (see Figure 1-8). As a result, any future lines between Canyonville and Ramsey Canyon could not be built on existing right-of-way.

Alternative 1, No Action Alternative: Adoption of the no action alternative would require that a program be developed to shed loads if demand grows as anticipated and no additional transmission capacity is

provided to the area. In addition, the reliability of service to the area would not be maintained under the no action alternative. The result would be an increased chance of outages to customers in southern Oregon and northern California when existing lines are overloaded or are unexpectedly taken out of service, such as when high winds damage existing facilities.

The extent to which loads would be dropped or service reduced is difficult to estimate. Barring weather-induced situations, problems would not occur until the mid-1980s and then only during periods of peak demand. Such demand peaks typically occur during cold periods in the winter or hot periods in the summer, when consumption of electricity for heating or cooling is high. The chance of dropping service to customers during such periods would be increased if the no action alternative is adopted. The customers to whom service would be reduced or eliminated is not known, but service to large industrial customers is typically dropped first. Detailed studies of load shedding which would occur if this project is not built were not conducted, but load shedding would probably be handled in a manner consistent with Oregon PUC Order No. 33 on actions taken by Pacific to conserve energy at times of deficiency of resources. Although it is difficult to quantitatively estimate the potential for outages, it is reasonable to conclude that the chances of service disruption markedly increase in 1986, and worsen thereafter.

In addition to the transmission system considerations outlined above, adoption of this alternative would not strengthen BPA's service to the Eugene area. Thus, outages in Eugene could occur, or at least would be more likely to occur, if the no action alternative is adopted.

In summary, the no action alternative would not satisfy the project's need. Instead, it would reduce the quality of electric service to southern Oregon and northern California in the mid 1980s and beyond.

Alternative 2, Parallel Alternative: The parallel alternative would provide more transmission capacity to the subregion than the preferred alternative because this alternative would allow the existing 230 kV system to be left intact. Leaving the 230 kV transmission system in place has two advantages. First, it provides redundancy to the transmission system upon completion of the project. Second, it allows for converting the existing 230 kV system to 500 kV in the future, thereby facilitating the ultimate establishment of two 500 kV lines between Eugene and Medford.

The cost of the parallel alternative would be approximately $74.6 million, which is about $5.4 million more than the preferred alternative. This incremental cost is much less than that for the double circuit alternative, and might be justified if only electrical system planning considerations influenced the alternative selection process.

Alternative 3, Double Circuit Alternative: The double circuit alternative would provide the most transmission capacity in the existing corridor. It would satisfy both the short-term need and long-term requirements. This alternative would cost approximately $121.6 million, or $52.4 million more than the preferred alternative, but would require no additional future land investment if a second 500 kV line were constructed.

Options

Little difference exists between Options D, E, F, G, and J and the preferred alternative as related to the project's purpose. In the discussion that follows, only options where a difference exists are discussed.

Option A involves removal of BPA's existing 230 kV line between Lane Substation and Spencer Switching Station and replacing it with a double circuit 500 kV line. It is estimated this option would cost $6,900,000, $400,000 less than the preferred alternative. Option A would not require new right-of-way between Twin Oaks and Lane which is the reason for the estimated cost difference. It is being considered primarily for environmental reasons, but has drawbacks from a system planning perspective because it requires the removal of the existing 230 kV line from service. The 230 kV line interconnects the Lane and Alvey Substations, balancing the electrical load between them. This is especially critical when the 500/230 kV transformers at Lane or Alvey are out-of-service. For this reason, the 230 kV Alvey-Lane line must remain in service after the Eugene-Medford transmission line is constructed.

Option B would involve bypassing the existing right-of-way south of Eugene and creating a new corridor between Twin Oaks and Camas Swale. Switches and other equipment for the new line would be installed in the existing Lane Substation. To satisfy BPA's future needs to complete a 500 kV loop around Eugene, when the second Eugene-Medford 500 kV line would be needed, a new 500 kV line would have to be built between Camas Swale and Alvey. Impacts of this construction would be addressed when a firm construction proposal is developed. Even though the future 500 kV loop would be completed, Option B does not efficiently satisfy this long-term need.

Option C involves terminating the line at Alvey Substation instead of Lane Substation. This option would reduce the overall length of the project by 9.5 miles and would cost approximately $3,010,000, which is $8,890,000 less than the preferred alternative. Although considerably shorter and estimated to cost less, Option C has inherent problems due to the physical space limitation at Alvey. The present Spencer Switching Station would have to be expanded by approximately 12 acres to acocommodate the necessary switches and support equipment for the 500 kV lines. The station would have to be completed by 1986 along with the transmission lines. The Lane Substation presently has

sufficient space within the yard to accommodate all the needed switches and equipment. Rather than expanding Spencer, the development at Lane would be a better utilization of an existing, available facility. In addition, BPA has identified the need for a future transmission line between Lane and Alvey, so that connecting the Eugene-Medford line into Alvey would merely delay, not eliminate, the need for a line between Lane Substation and Spencer Switching Station.

Options H and I would involve constructing lines within or adjacent to existing transmission corridors near Medford. In these options, as described earlier, some lines would be replaced while others would be paralleled for most effective use of existing corridors. If this approach is adopted, the potential use of these corridors for 230 or 115 kV local transmission lines is reduced. Thus, more costly design options (e.g., single pole structures) or new corridors would need to be considered for future transmission lines in the Medford area. This problem is most pronounced in White City, where urban development adjacent to the existing corridor limits potential for future transmission line development. It is of less concern in Sams Valley, where the existing right-of-way is narrower and less likely to be expanded for future lines. Concerns related to foreclosing the use of existing corridors for future transmission line development led to the identifiction of the ultimate development options in the Medford Basin. The ultimate development options could accommodate future transmission line development more readily than either Option H or I.

Options K, L, and M would satisfy the existing need and future requirements of the region. Each of these options would be superior, in terms of meeting future requirements, to either the preferred or parallel alternatives or any of the options in the Medford Basin because each option could accommodate a 500 kV line and local transmission lines in existing corridors. These options, particularly Options L and M, would also cost substantially more than the other plans corresponding to these routes. The cost of Option K would be $15,636,000 or $730,000 more than the corresponding portion of the preferred alternative. Option L would be $6,520,000 more expensive than Option H, while Option M would cost $5,889,000 more than Option I. Of the three Medford Basin ultimate development options, Options L and M would have a drawback in that locating all major transmission lines (500 kV and 230 kV) in one corridor would increase the chance of coincident failure of multiple lines and the consequences should coincident failure occur. The problem would be most acute where one line crosses over several others, but would be generally greater when all lines are located close together.

ENVIRONMENTAL COMPARISON

The environmental comparison of the alternatives is presented in Table 1-4. Detailed explanations of the impacts are described in Chapter 3 for each resource. The no action alternative is not included in Table

TABLE 1-4

COMPARISON OF ALTERNATIVES

Areas of Investigation	Impact Parameters	Summary of Potential Impacts by Alternatives: Preferred Alternative	Alternative 2 Parallel	Alternative 3 Double Circuit
General	Corridor length (miles)	146.8	146.8	146.8
	Area of new right-of-way (ac)	1,322.7	2,543.4	1,322.7
	New Access Roads (miles)	118.0	129.6	118.0
Soils	Level of Impact	I	I	I
	Approximate soil loss (tons/year)	5,400	5,900	5,400
Water Resources	West Fork Evans Creek	M	M	M
	Remainder of Route	I	I	I
Vegetation	Level of Impact	I	I	I
	Vegetation Clearing (ac)			
	Access Roads - Grassland	13	16	13
	(All Vegetation - Forest	185	202	185
	Cleared) - Riparian/Wetland	2	2	2
	Right-of-Way - Forest	790	1,539	790
	(Tall Vegetation - Riparian/Wetland	12	17	12
	Cleared)			
	Candidate Threatened or Endangered Plant Occurrence (no. known sites)	2	2	2
Wildlife	Level of Impact	M	M	M
	Habitat Modification (ac)	see Vegetation	see Vegetation	see Vegetation
	Length of New Access Roads Along New Corridor Alignment (miles)	102.5	102.5	102.5
	Columbian White-tailed Deer Effects	I	I	I
	Crucial Deer Winter Range			
	New Cleared R/W (ac)	87	128	87
	New Access Roads (miles)	10.4	11.2	10.4
	Waterfowl Collision Mortality Level	I	I	I
	Old-growth Habitat Reduction (ac)	37	38	37
	Salmonid Sedimentation Impacts			
	West Fork Evans Creek	M	M	M
	Remainder of Route	I	I	I
Cultural Resources	Level of Impact	I	I	I
Recreation Resources	High Recreation Impact Areas	0	0	0
	Moderate Recreation Impact Areas	4	4	5
Visual Resources	High Visual Impact Areas	2	2	4
	Moderate Visual Impact Areas	2	2	6
Land Use	Commercial/Industrial Uses			
	High Impact Areas	0	0	0
	Moderate Impact Areas	0	0	0
	Residential Land Use			
	High Impact Areas	1	1	1
	Moderate Impact Areas	1	4	4
	Permanently affected acreage of prime agricultural soils	1	2	1
	Additional right-of-way acreage on prime agricultural soils	30	170	30
	Temporarily disturbed acreage of Agricultural Soils	26	33	26
	Permanently affected acreage of classified commercial forest lands	459	1,238	459
Economic Conditions	Level of Impact	I	I	I
	Permanent loss of timber production (MBF/yr)	207.2	647.6	207.2
	Value of lost production approximate ($/yr)	$46,600	$145,700	$46,600
	Lost timber employment (number of jobs)	1.3	4.0	1.3
	Total Construction Payroll (millions of dollars)	12.8	12.8	19.0
Social Conditions	Dwelling units within 1000 feet of line right-of-way			
	Houses	320 - 370	320 - 370	320 - 370
	Apartments	230 - 290	230 - 290	230 - 290

LEVEL OF IMPACT: I = INSIGNIFICANT IMPACT, M = MODERATELY SIGNIFICANT IMPACT, H = HIGHLY SIGNIFICANT IMPACT

1-4 because impacts associated with it are minimal, except for potential social and economic impacts which are speculative but negative in relation to anticipated future load growth.

The options are compared in Tables 1-5 and 1-6. Table 1-5 presents a comparison of Options A through G with the corresponding portions of the preferred alternative. This approach facilitates a direct comparison with the preferred alternative which also serves as an analytical benchmark. Table 1-6 provides the same comparisons for the options in the Medford Basin (Options H, I, K, L, and M). Topics listed in the tables correspond with those in the text, except that the tables do not include data on cultural resources. Detailed field studies of cultural resources were only conducted on certain segments of the preferred route; further studies will be conducted in additional areas, as noted in Chapter 3 and Appendix A. Option J is also not included in the table because the unique requirements of an underground transmission line river crossing do not facilitate a tabular comparison with other options.

Impacts have been quantified and their significance assessed where possible. The terms high, moderate, and insignificant have been used, applying criteria (context and intensity) identified by the Council on Environmental Quality (CEQ) to categorize the significance of impacts. Determinations of significance are presented in Chapter 3 and summarized in Tables 1-4, 1-5 and 1-6. The level of significance for those impacts which can be quantified is determined by considering the context and intensity of impacts as described in Chapter 3 for each resource category. A brief, narrative comparison of significant environmental impacts is also presented. The narratives deal with significant physical, biological and social science impact considerations.

Physical Sciences

Significant impacts associated with the physical environment (air and water resources, soils, and geology) would be limited to increased erosion and sedimentation in the area of West Fork Evans Creek. New and upgraded access road construction and tower site work would be the primary cause of increased erosion and sedimentation in this area. The highly erodible granitic soils near West Fork Evans Creek make erosion difficult to control, although practices required by BLM and the State of Oregon would limit impacts. It is, nevertheless, uncertain that impacts in this area would be reduced to a level of insignificance.

Biological Sciences

Construction of the preferred alternative, Alternatives 2 or 3, or Option K would have moderately significant wildlife impacts along the new corridor segment in the Medford area. The loss of habitat caused by access road construction and the increased disturbance caused by greater human access which would likely occur during and after

TABLE 1-5
COMPARISON OF OPTIONS A-G

Areas of Investigation	Impact Parameters	Lane Twin Oaks Replacement Option A	Preferred Alternative Corresponding Portion	Option B,	Preferred Alternative Corresponding Portion	Alvey-Spencer Option C	Preferred Alternative Corresponding Portion	North Umpqua Highway Bypass Option D	Preferred Alternative Corresponding Portion	Option E, Canyonville Existing Corridor	Preferred Alternative Corresponding Portion	Option F, Green Mt. Existing Corridor	Preferred Alternative Corresponding Portion	Option G, West Fork Evans Creek Existing Corridor	Preferred Alternative Corresponding Portion
General	Corridor length (miles)	7.5	7.5	14.2	16.3	2.0	11.5	5.1	5.1	4.2	2.7	7.9	6.9	4.5	3.8
	Area of new right-of-way (Ac)	0	106	259	137	30	114	96	0	38	57	72	146	41	81
	New Access Roads (miles)	0.9	1.6	18.3	3.0	0.6	2.3	2.5	0.6	0.8	8.1	1.5	20.7	0.7	10.1
Soils	Level of Impact	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Approximate soil loss (tons/yr)	50	70	400	240	50	120	100	60	60	230	110	590	60	290
Water Resources	Level of Impact	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Vegatation	Level of Impact	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Vegetation Clearing (Ac)														
	Access Roads - Grassland	1	1	5	2	<1	I	4	1	<1	0	0	0	0	0
	(All Vegetation - Forest	I	2	26	3	1	3	<1	<1	1	14	2	18	1	17
	Cleared) - Riparian/Wetland	0	0	<1	<1	0	0	0	0	0	0	0	0	<1	<1
	Right-of-Way - Forest	0	47	133	53	16	47	4	0	22	41	48	104	24	50
	(Tall Vegetation - Riparian/Wetland Cleared)	0	0	<1	0	0	0	0	0	0	0	0	0	1	2
	Candidate Threatened or Endangered Plant Occurrence (no. known sites)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildlife	Level of Impact	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Habitat Modification (ac)	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation
	Length of New Access Roads Along New Corridor Alignments (miles)	0	0	16.7	0	0	0	1.5	0	0	8.1	0	20.7	0	10.1
	Columbian White-tailed Deer Effects	None	None	None	None	None	None	I	I	None	None	None	None	None	None
	Crucial Deer Winter Range														
	New Cleared R/W (Ac)	0	0	0	0	0	0	0	0	0	0	0	0	12	20
	New Access Roads (Miles)	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3.9
	Waterfowl Collision Mortality Level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Old-growth Habitat Reduction (ac)	0	0	0	0	0	0	0	0	9	14	3	8	2	4
	Salmonid Sedimentation Impacts	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Recreation Resources	High Recreation Impact Areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate Recreation Impact Areas	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Visual Resources	High Visual Impact Areas	0	0	0	I	0	I	0	0	0	0	0	0	0	0
	Moderate Visual Impact Areas	0	0	0	0	0	0	0	I	0	0	0	0	0	0
Land Use	Commercial/industrial uses														
	High impact areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate impact areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Residential land use														
	High impact areas	0	0	0	1	0	1	0	0	0	0	0	0	0	0
	Moderate impact areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Permanently affected acreage of prime agricultural soils	0	0	<0.5	0.5	0	0.5	0	0	0	0	0	0	0	0
	Additional right-of-way acreage on prime agricultural soils	0	0	32	9	0	6	0	0	0	0	0	0	0	0
	Temporarily disturbed acreage of agricultural soils	1	1	11	2	<0.5	2	5	<0.5	0	0	0	0	1	2
	Permanently affected acreage of classified commercial forest lands	0	29	106	36	5	29	17.2	0	32	17	72	52	37	17
	No. towers in floodplain	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Economic Conditions	Level of Impact	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Permanent loss of timber production (MBF/yr)	0	17.5	71.6	22.1	3.3	17.5	7.6	0	14.1	7.6	34.2	22.5	16.5	7.6
	Value of lost production (approximate $/yr)	0	3,900	16,100	5,000	700	3,900	1,700	0	3,200	1,700	7,700	5,100	3,700	1,700
	Lost timber employment (number of jobs)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Social Conditions	Dwelling units within 1000 feet of right-of-way														
	Houses	24-28	24-28	16-20	80-90	0	100-115	2-4	20-25	4-6	0	0	0	4	4
	Apartments	0	0	0	230-290	0	230-290	0	0	0	0	0	0	0	0

LEVEL OF IMPACT: I = INSIGNIFICANT IMPACT, M = MODERATELY SIGNIFICANT IMPACT, H = HIGHLY SIGNIFICANT IMPACT

TABLE 1-6
COMPARISON OF MEOFORO BASIN OPTIONS[1/] (H, 1, K, L AND M)

Areas of Investigation	Impact Parameters	Preferred Alternative Medford Portion	Option H West Route	Option I Existing Corridor	Option K[2/] Preferred Alternative, Ultimate	Option L[3/] West Route Ultimate	Option M[4/] Existing Corridor Ultimate
General	Corridor length (miles)	31.1	30.4	28.5	31.3	30.4	28.5
	Area of new right-of-way (ac)	657.8	502.6	376.4	1,132.1	737.5	469.0
	New Access Roads (miles)	73.8	36.3	15.2	73.8	36.7	15.6
Soils	Level of Impact	I	I	1	I	I	I
	Approximate soil loss (tons/yr)	2,000	1,310	430	2,000	1,310	430
Water Resources	Level of Impact	I	I	I	I	I	1
Vegetation	Level of Impact	I	I	I	I	I	I
	Vegetation Clearing (ac)						
	Access Roads - Grassland	9	3	3	9	4	4
	(All Vegetation - Forest	114	58	22	114	58	22
	Cleared) - Riparian/Wetland	2	<1	<1	2	<1	<1
	Right-of-Way - Forest	402	288	189	402	288	189
	(Tall Vegetation - Riparian/Wetland	11	6	6	11	6	6
	Cleared)						
	Candiate Threatened or Endangered Plant Occurrence (no. known sites)	0	1 (probable)	1 (probable)	0	1 (probable)	1 (probable)
Wildlife	Level of Impact	M	1	I	M	I	I
	Habitat Modification (ac)	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation	see Vegetation
	Columbian White-tailed Deer Effects	None	None	None	None	None	None
	Crucial Deer Winter Range						
	New Cleared R/W (ac)	50	9	6	50	9	6
	New Access Roads (miles)	8.5	1.3	1.2	8.5	1.3	1.2
	Waterfowl Collision Mortality Level	I	I	1	I	I	1
	Old-growth Habitat Reduction (ac)	4	13	4	4	13	4
	Salmonid Sedimentation Impacts	1	I	I	I	I	I
Cultural Resources	Level of Impact	I	I	I	I	I	I
Recreation Resources	High Recreation Impact Areas	0	0	0	0	0	0
	Moderate Recreation Impact Areas	2	0	0	2	0	0
Visual Resources	High Visual Impact Areas	1	0	0	1	0	0
	Moderate Visual Impact Areas	1	1	1	1	1	1
Land Use	Commercial/Industrial Uses						
	High Impact Areas	0	0	0	0	0	0
	Moderate Impact Areas	0	0	0	0	1	1
	Residential Land Use						
	High Impact Areas	0	0	0	0	0	1
	Moderate Impact Areas	1	0	1	1	2	2
	Permanently affected acreage of prime agricultural soils	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Additional right-of-way acreage on prime agricultural soils	21	0	4	21	0	4
	Temporarily disturbed acreage of Agricultural Soils	13	5	3	13	5	3
	Permanently affected acreage of classified commercial forest lands	135	183	49	135	183	49
	No. towers in floodplain	3	3	3	3	3	3
Economic Conditions	Level of Impact	I	I	I	I	I	I
	Permanent loss of timber production (MBF/yr)	45.7	61.9	16.5	45.7	61.9	16.5
	Value of lost production (approximate $/yr)	10,300	13,900	3,700	10,300	13,900	3,700
	Lost timber employment (number of jobs)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Social Conditions	Owelling units within 1000 feet of right-of-way						
	Houses	20-24	100-120	130-160	20-24	100-120	130-160
	Apartments	0	0	0	0	0	0

Level of Impact - 1 = Insignificant Impact, M = Moderately Significant, H = Highly Significant Impact
1/ All options originate at West Fork Evans Creek and terminate at Meridian Substation.
2/ Could require up to 8.5 miles of new access roads in future.
3/ Could require up to 5.4 miles of new access roads in future.
4/ Could require up to 4.3 miles of new access roads in future.

construction would reduce the quality of wildlife habitats in those presently remote areas north and east of Medford. Impacts due to new access road construction in new alignment portions of Options H and L are not expected to be significant due to the steepness of the area which inhibits human access and the lesser amount of new access road construction relative to the preferred alternative. Of the routes under consideration in the Medford area, the route of Options I and M would minimize wildlife impacts resulting from access road construction.

Impacts to salmonids may be moderately significant in the West Fork Evans Creek drainage due to sedimentation problems resulting from unstable soils for all construction alternatives. Alternative 2 would have the greatest potential for signficant impacts in this area. None of the options would modify the potential for impacts.

Social Sciences

Impacts on the social environment are broad, and in some instances, significant. Significant impacts occur in the areas of visual resources, recreation, and land use.

Recreation

Impacts of the project alternatives and options on recreation would be insignificant in most cases, but would be significant at a few specific sites. The recreation impacts of the proposed line would be limited to changes in the character of views from these sites that would detract from the quality of the recreation experience. Designated recreation sites along the preferred alternative include proposed sections of the Ridgeline Trail in South Eugene, and Takelma Park near the Rogue River Crossing; impacts on both would be significant. In the case of Options H, I, L, and M in the Medford Basin, the existing corridor passes through Hoover Ponds and Medford Sports Park. Impacts on the former would not be significant if the park remains undeveloped, but could increase if the park is developed for passive uses such as nature trails and views. However, this appears unlikely. The intensive recreation activity at Medford Sports Park would not be affected by visual changes introduced by a transmission facility.

Adverse effects on dispersed recreation would be significant at the North Umpqua Highway. These impacts could be avoided and the visual impacts of the existing transmission lines could be rehabilitated to a large extent by rerouting the line down a side valley (Option D).

The impact on dispersed recreation along the Rogue River would be significant at the preferred alternative crossing, just north of Takelma Park. Options H, I, K, and L would not cause significant incremental impacts at the existing Rogue River crossing. The underground option, J, would have significant impacts on recreation during construction, but would reduce long-term impacts to a minimum.

Visual Resources

All alternatives and options, with the exception of the no action alternative, would have significant visual impacts. The parallel alternative would have greater impacts than the preferred alternative, due to increased clearing and the retention of existing lines. The double circuit alternative would cause greater visual impacts than one single circuit line in the short term, but less impacts than two single circuit lines in the long term. The preferred and double circuit alternatives would cause high visual impacts in one area each while the parallel alternative would cause high visual impacts in three areas. This number could be reduced or increased with the adoption of various options.

Options B and C would avoid the high impact segment of the Twin Oaks-Spencer section of the preferred alternative, although Option B would create significant impacts by opening a new corridor between Lane and Camas Swale. Option D, the North Umpqua Highway Bypass, would help to rehabilitate the adverse visual effects of the existing corridor along this designated scenic highway, thereby eliminating a significant impact site. Option E would have a significant impact on the I-5 corridor.

In the Medford Basin, the visual impact comparison of the preferred alternative and Option K to Options H, I, L, and M involves a tradeoff between viewer exposure and visual contrast with existing conditions. Options H, I, L, and M would be visible to many more people than the preferred alternative, but would not cause signficant contrast with existing visual resources or significant change in scenic quality, except in the Lower Table Rock area. Therefore, impacts would be categorized as moderately significant for these options. For the preferred alternative and Option K which involve opening a new corridor, visual impacts are rated as high.

Land Use

The preferred alternative would have no effect on commercial and industrial uses because it would not cross areas used for these purposes. The existing corridor in the Medford Basin crosses an area of commercial and light industrial development in White City. Options H and I would have no effect on this development because they could be accommodated with the existing right-of-way. Options L and M would require more right-of-way and result in a significant land use impact. However, these options would establish a corridor in the Medford Basin that would accommodate all transmission development for the foreseeable future and would thus reduce the potential for significant land use conflicts later.

The primary effects of the preferred alternative on residential land use would be the decrease in visual amenity now associated with a number of residential areas that the proposed line would cross. These

adverse effects would be significant in the South Eugene area, where a large number of residences occur about the existing corridor, and in the Medford Basin. Alternatives 2 and 3 would cause a significant increment of visual impact at other residential concentrations, including Lynx Hollow, West Cottage Grove, Fair Oaks, and Elkhead.

Options B and C would avoid the heavily developed Fox Hollow Road area in South Eugene and so would reduce visual impacts. Option B, however, would open a new corridor through a developing rural residential area and have significant impacts in itself. In the Medford Basin, where all options have moderately significant impacts, Options H, I, L, and M would increase residential impacts associated with incremental visual impacts along the existing corridor, but would avoid other impacts associated with opening a new corridor through more sparsely developed terrain on the perimeter of the Medford Basin. Options L and M also appear to require the purchase of three residences near the Meridian Tap to reserve sufficient right-of-way for possible future 500 kV development.

Economic and Social Conditions

The effects of the proposed transmission line on agricultural and forest productivity, local tax bases, and economic activity in the surrounding area would be insignificant, although some individual landowners would experience or perceive adverse effects. Social consequences resulting from an influx of transmission line workers, noise, and electrical and magnetic effects would also be insignificant. Adverse social reaction to the project would likely be significant in some areas, although this response cannot be measured and stems directly from land use, visual and other impacts. Negative economic and social effects could result from the no action alternative, but the severity and likelihood of such effects cannot be established.

POSSIBLE MITIGATION MEASURES

During the preparation of the Draft EIS, mitigation measures were identified by the preparers of the EIS and other interested parties. These mitigation measures go beyond the techniques that BPA and Pacific routinely employ as part of their standard design and construction practices and are described earlier in this chapter and in Appendix A. These mitigation measures would then be considered prior to issuance of the BLM grant of right-of-way, the BPA Record of Decision, and the EFSC Site Certificate.

Specific mitigation measures warranting consideration are identified below:

1) Visibility of conductors and towers could be minimized, as follows:

   a) Use of non-reflective conductors from Lane Substation to Spencer Switching Station.

   b) Use of nonreflective treatments to dull galvanized tower steel, minimize its color contrast with the surrounding landscape, and hence reduce tower visibility could be employed along the Lane-Spencer segment and along Options A, B, and C.

      Considerations: The measures described in a) and b) above could make the proposed line less visually prominent and more compatible with the existing visual setting and therefore could reduce overall visual impacts. The additional estimated cost to apply a color-tinted vinyl wash to the tower steel and string non-reflective conductor for these sections of line is $500,000.

2) Tubular steel structures could be used instead of steel lattice structures to reduce adverse visual impacts in areas characterized by high visual quality, high viewer sensitivity, or a combination of both. These areas include the portion of the Lane-Spencer segment between South Willamette Street and Dillard Road (approximately 3 miles), a residential area west of Cottage Grove (approximately 3 miles), both sides of the North Umpqua River crossing (approximately 1 mile), the route segment parallel to the North Umpqua Highway if Option D is not selected (approximately 4 miles) the North Umpqua Highway crossing if Option D is selected (approximately 1 mile), the Rogue River and the Crater Lake Highway crossing on the preferred alternative (approximately 4 miles), and the segment of Options L and M that parallels Route 140 from the White City Substation to the White City Rifle Range (Medford Sports Park) (approximately 3 miles).

   Considerations: The visual complexity and large apparent scale of steel lattice structures is frequently a principal cause of adverse effects on visual quality in urban areas and scenic areas. These effects are worsened when lattice structures are viewed close at hand by large numbers of people or by sensitive viewing groups such as people engaged in recreation. In comparison, the simplicity and smaller apparent scale of tubular steel structures encroach significantly less on visual quality in scenic areas and are more compatible with urban areas. The route segments listed above are those where the most serious adverse visual effects are likely. (Note: Tubular steel single circuit structures are already proposed for the route segments through Sams Valley (Option I) and from White City Substation to the White City Rifle Range).

   The use of tubular steel structures, however, involves tradeoffs. Because more towers are needed per mile for tubular structures, more land would be occupied by towers than if lattice structures

were employed. Use of tubular structures might also make it more difficult to span and avoid a potential cultural resource site near the North Umpqua River.

The cost of single circuit tubular steel structures has been estimated by Pacific to be approximately $200,000 more per mile than lattice structures; the cost differential for double circuit structures is substantially higher. A current estimate to construct double circuit tubular structures on the BPA portion of the project is unavailable at this time. Further, if angle structures are required in a particular area, the cost difference between tubular and lattice structures becomes more pronounced.

INCOMPLETE OR UNAVAILABLE INFORMATION

Evaluating environmental impacts for the proposed transmission line requires forecasting project activities and environmental conditions. There is always uncertainty associated with such forecasts. In addition, there are some other areas where information is incomplete. The list below identifies important uncertainties in assessing the impact of this project.

1) Detailed design information for all of the transmission line alternatives and options is not available. This information would be useful for detailed quantification of impacts but would not be available until survey and design activities are completed for the selected alternative. These data are not necessary, however, for evaluating environmental impacts so that alternatives and options can be compared.

2) Threatened or endangered plant surveys have not been conducted along any of the new alignment portions of the preferred alternative. Because less information is available for the new alignment portions of the preferred alternative, analyses of these areas are less complete than for areas where surveys were conducted. These detailed studies are not needed to assess impacts in this EIS, but would be required for the selected route prior to construction to identify specific areas so sensitive species could be avoided.

IMPLEMENTATION OF THE DECISION

BLM will develop their proposed decision after the final EIS is published and the Oregon Energy Facility Siting Council selects one of the alternatives or a combination of any of the alternatives and options. The proposed decision may be to select one of the alternatives intact, or to formulate and select an alternative combining features of any of the alternatives and options presented in the EIS.

After release of the Final EIS (but not before conclusion of the 30-day comment period) the State Director will review the deliberations of the Oregon Energy Facility Siting Council and public comments on the draft and final EISs. The State Director in conjunction with cooperating agencies will consult with Advisory Councils, local county commissioners, and appropriate state and county offices and the Governor's Natural Resource Assistant prior to deciding whether to issue a right-of-way permit. All state and local government consultation will be coordinated with the activities of the Energy Facility Siting Council.

After consultation is complete, which will be several months after the final EIS is released, the State Director would authorize a grant of right-of-way, if appropriate. The issuance of this right-of-way permit, or a decision not to issue one, represents BLM's decision point. The final decision would be presented in the Record of Decision and would consider all available information including public opinion, input from state and local organizations, policy and legal constraints, as well as the EIS analysis.

If the decision is made to grant a right-of-way, Pacific would be authorized to begin its survey, design, and construction activities. Regardless of which alternatives or options would be selected (except for the no action alternative), Pacific would construct the line as described in the permit. The timing of project activities, however, could be delayed from one to several years if loads do not grow as forecasted in the Purpose and Need Section.

If BLM decides to issue a right-of-way permit, Pacific's activities would be undertaken in accordance with the terms and conditions of the right-of-way permit, and applicable federal, state, and local laws and regulations.

BPA will make the decision as to the routing and line configuration in the vicinity of Eugene. This determination will be formally documented in a Record of Decision. The notice of the decision will not be prepared until at least 30 days after the Final EIS is filed.

INTERRELATIONSHIPS

The BLM will make its decision regarding implementation of the proposed project in accordance with the requirements of the agency's planning process, as established under the Federal Land Policy and Management Act and subsequent regulations. On this project BLM is also participating in a planning process designed to combine federal and state project review activities as described in the Memorandum of Understanding between BLM, Pacific, BPA, and Oregon DOE, the cooperating parties for this project. BLM is also undertaking its activities on this project in consultation with other federal agencies. Each of the agencies identified in Chapter 4, as well as others not listed, have been contacted during preparation of the EIS.

STATE AND LOCAL GOVERNMENTS

Project activities that relate to state and local jurisdictions are conducted under the direction of the State of Oregon's Energy Facility Siting Council (EFSC). Its staff, the Oregon Department of Energy, is participating in project evaluation activities throughout the duration of the project. The responsibilities of the Council, the standards that must be met by 500 kV transmission projects, and Council rules adopted for this project are all contained in OAR 345.

Among the tests that EFSC will apply to Pacific's application for a site certificate is an evaluation of the relative consistency of the transmission alternatives and options with the Statewide Planning Goals and Guidelines developed by the Land Conservation and Development Commission (LCDC). Under Oregon Senate Bill 100, all counties and cities are required to develop and adopt comprehensive plans and land use goals consistent with the LCDC Goals and Guidelines. The EFSC rules require that local governments affected by a transmission proposal be given the opportunity to make an initial determination of consistency between the proposal and their plans. EFSC then reviews these initial determinations in preparing its findings on project consistency with statewide goals and guidelines. BLM and BPA must also consider project consistency with state and local plans under the terms of the Intergovernmental Cooperation Act (42 USC 4233).

The proposed transmission line would cross Lane, Douglas, and Jackson Counties and the City of Eugene. All of these governments have adopted comprehensive plans (Eugene and Lane County prepared a joint plan for the metropolitan area) and have submitted these plans to LCDC for review and formal acknowledgment. Upon review, LCDC has concluded that portions of the Eugene/Lane and Jackson County plans do not meet the statewide goals and guidelines. The Douglas County plan is still under review. For this reason, as well as for brevity, the general consistency of the proposed transmission line with the relevant statewide goals and guidelines is discussed here. Nevertheless, the provisions of the county plans that relate to transmission lines are broadly similar to those of the statewide goals and guidelines.

The transmission project is likely to have direct effects on resources that are central to certain goals, have indirect or lesser effects in relation to other goals, and be unrelated to still others. This is recognized by LCDC (Ross 1981). The consistency issues for the first two classes of goals are summarized in Table 1-7. In addition, the project's relationship to the goal pertaining to Citizen Involvement is included in Table 1-7. While all the transmission alternatives and options are broadly consistent with the statewide goals and guidelines, the relative degree of consistency varies with the specific impacts of route and configuration examined. Table 1-7 provides a means to translate the impact described in this EIS and summarized in Tables 1-5 and 1-6 into the framework of state and local planning consistency.

TABLE 1-7
PROJECT RELATIONSHIP TO LCDC GOALS*

LCDC GOAL	DISCUSSION**
1. To ensure citizen involvement in all phases of the planning process.	Citizen involvement has been solicited at each stage of the EIS process. Public meetings were held at project scoping, workshops were conducted when the routing options were being defined, and public hearings will be conducted on the content of this EIS. Other public meetings and hearings have been conducted as part of the EFSC evaluation process.
3. To preserve and maintain agricultural lands.	The transmission alternatives and options differ in the amount of prime farmland required for right-of-way, but overall effects on agricultural production will not be significant.
4. To conserve forest land for forest uses.	The alternatives and options differ in the amount of forest land taken out of production and to the extent to which they maximize utilization of utility rights-of-way before permitting new ones.
5. To conserve open space and protect natural and scenic resources.	This resource conservation goal includes most noncommercial resource values. Generally, alternatives and options which include the greatest amount of new alignment and access roads are least consistent as these activities are most detrimental to this goal.
6. To maintain and improve the quality of the air, water and land resources of the state.	The purpose of Goal 6 is to maintain a healthful environment. For any of the alternatives, there would be short-term impacts during construction. In general, consistency of the goal is least for alternatives and options involving the greatest length of new alignments and new access roads as these have the greatest soil loss and sediment yield.
7. Developments subject to damage or that could result in loss of life shall not be planned nor located in known areas of natural disasters and hazards without appropriate safeguards.	While this goal is relevant to transmission planning and design, it appears that none of the alternatives or options would pose, or be subject to, a significant risk of damage due to natural disasters or hazards.
9. To diversify and improve the economy.	Progress toward this goal is generally not affected by differences between alternatives, with the possible exception of the no action alternative.
10. To provide for the housing needs of the citizens of the state.	This goal is oriented toward maintaining and increasing the housing supply. The proposed transmission line would not appreciably affect the number of houses or availability of land for housing. However, the alternative and options would reduce the amenity values of adjacent housing to differing degrees.
11. To plan and develop a timely, orderly, and efficient arrangment of public facilities and services.	This goal supports the multiple use of public utility easements, the selection of corridors with least environmental impact, and the maximum use of existing investments in public utilities. The alternatives and options differ on these criteria.
13. To maximize the conservation of all forms of energy, based upon sound economic principles.	The proposed line is generally consistent with this goal because it reduces line losses. The alternatives and options do not differ much on this criterion, except for the no action alternative.

* Goals 2, 8, 12, 14, 15, 16, 17, 18, and 19 are not generally applicable to the proposed transmission line.
** See Chapter 3 for impacts of the transmission alternatives and route options on the resources discussed in this table.

CHAPTER 2

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter provides information regarding existing conditions in the project area. Only data considered essential to understanding the basis for subsequent impact analysis are presented in this EIS, while additional detail is provided in the Technical Investigations Report, Routing Study Report, and Appendices to this EIS. The Routing Study Report was designed to identify routing options other than the existing corridors in the Eugene and Medford areas, while the Technical Investigations Report represents the comprehensive data base on existing conditions upon which the impact analyses are based. In order to minimize overlap among the subject areas, brief introductory statements are provided in certain subsections to relate their contents to other pertinent subsections.

The location of areas with potentially significant environmental concerns associated with proposed and existing transmission corridors are shown on Figures 2-1 and 2-2 for the Eugene-Roseburg and Roseburg-Medford segments of the line, respectively.

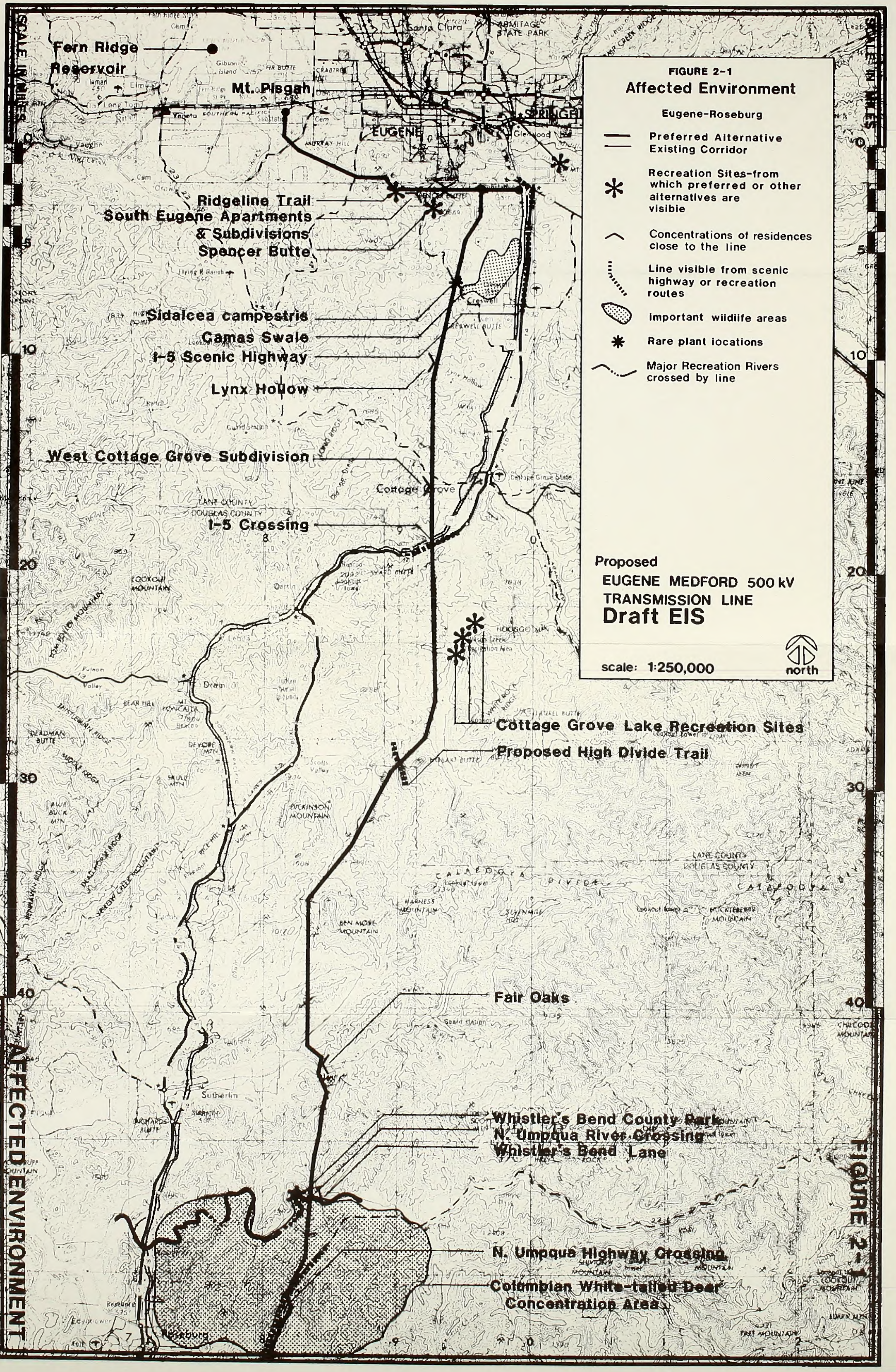
CLIMATE AND AIR QUALITY

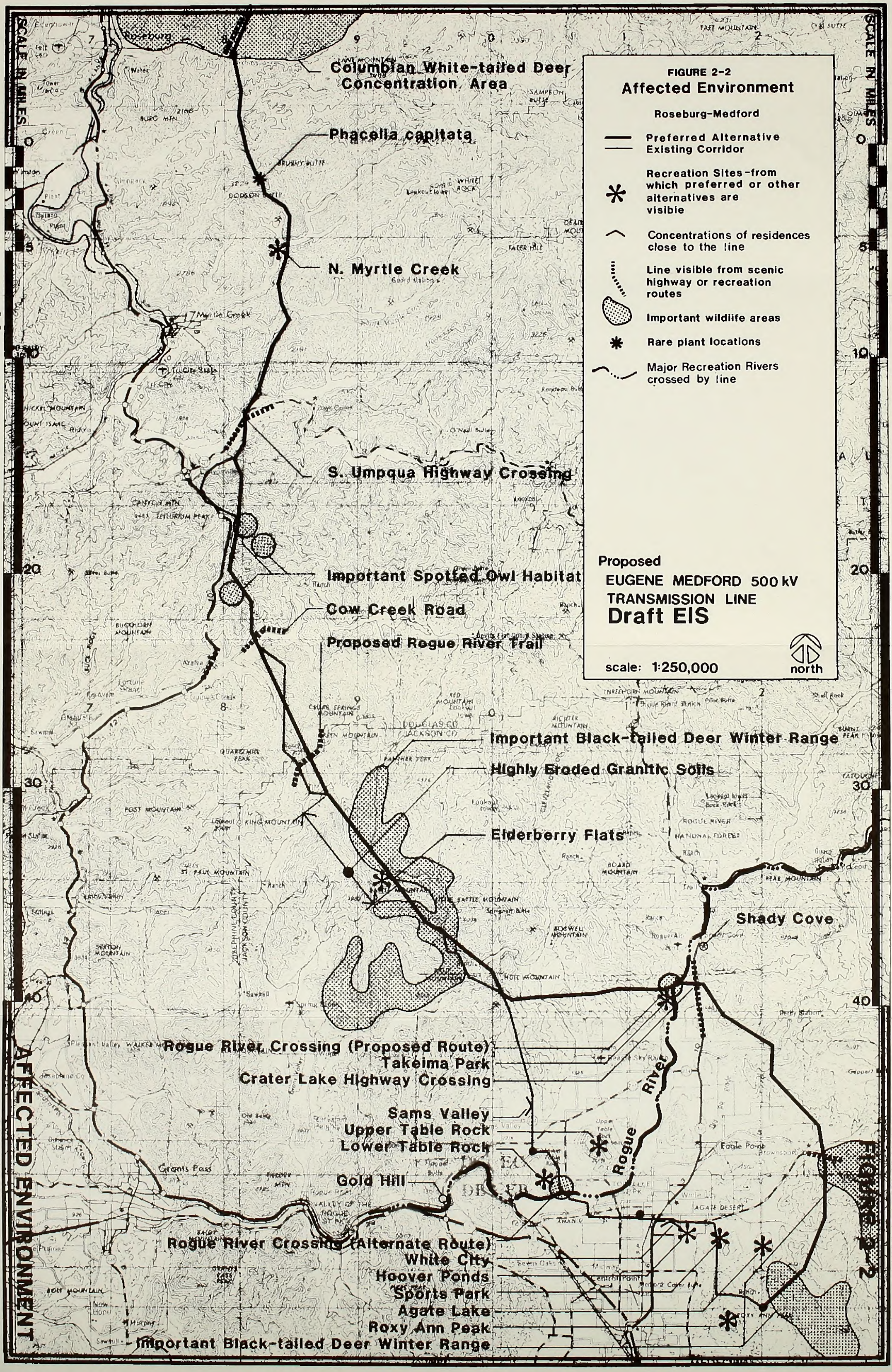
CLIMATE

The climate in the project area is strongly influenced by the Pacific Ocean and mountains of the Coast and Cascade Ranges (USDI BLM 1978a). The result is a temperate, maritime climate characterized by moderately warm summers and wet, mild winters. Local variations in precipitation and temperature can be large, depending on changes in altitude and aspect of mountain slopes.

In the northern part of the study area, the lower lands of the Willamette and Umpqua Valleys lie between the Coast and Cascade Ranges. Warm, moisture-laden air from the Pacific cools as it rises over the Coast Range and heavy precipitation occurs at higher elevations. The air warms as it descends into the valleys, resulting in relatively lower precipitation and higher temperatures. Roseburg experiences about 85 percent cloud cover, 5.5 inches of precipitation per month, and 40°F average temperature during the November to February winter storm season. About 20 percent cloud cover, less than 0.5 inches of precipitation per month, and 65°F average temperature occur during the June through September dry season.

South of Roseburg, topography is more rugged with no well-defined valley between the Coast and Cascade Ranges. Therefore, local climate is highly variable. Elevations are generally higher than in areas to the north, resulting in somewhat lower temperatures in winter and greater snowfall. Winter snowfall is common above 2,500 feet. Above 3,000 feet, snow persists and accumulates.


Fern Ridge Reservoir
Mt. Pisgah
Ridgeline Trail
South Eugene Apartments & Subdivisions
Spencer Butte
Sidalcea campestris
Camas Swale
I-5 Scenic Highway
Lynx Hollow
West Cottage Grove Subdivision
I-5 Crossing
Cottage Grove Lake Recreation Sites
Proposed High Divide Trail
Fair Oaks
Whistler's Bend County Park
N. Umpqua River Crossing
Whistler's Bend Lane
N. Umpqua Highway Crossing
Columbian White-tailed Deer Concentration Area
FIGURE 2-1
Affected Environment
Eugene-Roseburg
Preferred Alternative
Existing Corridor
Recreation Sites-from which preferred or other alternatives are visible
Concentrations of residences close to the line
Line visible from scenic highway or recreation routes
important wildlife areas
Rare plant locations
Major Recreation Rivers crossed by line
Proposed
EUGENE MEDFORD 500 kV
TRANSMISSION LINE
Draft EIS
scale: 1:250,000
north
EUGENE
SPRINGFIELD
Santa Clara
ARMITAGE STATE PARK
Cottage Grove
Roseburg
Sutherlin
Drain
Yoncalla
Creswell
LANE COUNTY
DOUGLAS COUNTY
CALAPOOYA DIVIDE


Columbian White-tailed Deer Concentration Area
Phacelia capitata
N. Myrtle Creek
S. Umpqua Highway Crossing
Important Spotted Owl Habitat
Cow Creek Road
Proposed Rogue River Trail
Important Black-tailed Deer Winter Range
Highly Eroded Granitic Soils
Elderberry Flats
Shady Cove
Rogue River Crossing (Proposed Route)
Takeima Park
Crater Lake Highway Crossing
Sams Valley
Upper Table Rock
Lower Table Rock
Gold Hill
Rogue River Crossing (Alternate Route)
White City
Hoover Ponds
Sports Park
Agate Lake
Roxy Ann Peak
Important Black-tailed Deer Winter Range
FIGURE 2-2
Affected Environment
Roseburg-Medford
Preferred Alternative
Existing Corridor
Recreation Sites-from which preferred or other alternatives are visible
Concentrations of residences close to the line
Line visible from scenic highway or recreation routes
Important wildlife areas
Rare plant locations
Major Recreation Rivers crossed by line
Proposed
EUGENE MEDFORD 500 kV
TRANSMISSION LINE
Draft EIS
scale: 1:250,000
north
SCALE IN MILES
Roseburg
Myrtle Creek
Tiller
Rogue River
Grants Pass
Shady Cove
Eagle Point

AIR QUALITY

Air quality is measured by comparing air pollutant concentrations with ambient air quality standards. Air pollutant concentrations exceed standards in the cities of Eugene and Medford but have not been measured to exceed standards in areas between these cities, although relatively little air quality monitoring has been undertaken in these areas. The air quality of the Eugene-Springfield area exceeds national and Oregon standards for carbon monoxide and particulate matter, while the Medford-Ashland area exceeds standards for carbon monoxide, particulate matter, and ozone. As officially designated "nonattainment areas," these urban areas are required to have plans to bring air quality to acceptable levels. Air quality condition outside the non-attainment areas has been designated as achieving the National or Oregon Ambient Air Quality Standards. In the area of concern, measurements of Total Suspended Particulate Matter are routinely made at Creswell, Roseburg, and Oakridge.

In the Medford area, the annual geometric mean concentration is 79 micrograms per cubic meter (ug/m^3), above the standard of 60 ug/m^3, with 10 exceedences of the 24-hour standard in 1980 (Oregon Department of Environmental Quality, 1981). In the Eugene area, the highest geometric mean annual concentration is 44 ug/m^3 with 2 exceedences of the 24-hour standard in 1980.

Sources of air pollution in the project area include a kraft pulp mill in Springfield, several wood products facilities, a nickel mine and smelter in Riddle, Oregon, wood stoves, and mobile sources (automobiles and other vehicles). Open burning of grass and forest slash also contributes to short-term violations of ambient air quality standards. Dispersion conditions in the Willamette Valley and the Medford Basin are conducive to high air pollution concentrations.

GEOLOGY AND SOILS

The project area of the proposed transmission route encompasses three physiographic provinces: the Cascade Range, the Klamath Mountains, and the Willamette Lowland. The bedrock geology consists of sedimentary sandstones, conglomerates, siltstones and shales; igneous basalts and diorites; and metamorphic equivalents of several of the above. Unconsolidated sediments consist of alluvial deposits in river channels and floodplains, and colluvium along the borders of major valleys and in smaller intermountain valleys.

Soil properties vary considerably throughout the project area because of the diverse topography and parent materials. In general, soils on steep slopes are least mature and most susceptible to erosion, whereas those on north-facing slopes, near the base of slopes, and in gentle topography are generally more developed.

Three types of bedrock (granite, serpentine, and tuffs and breccias) have weathered to soils with slope stability or surface erosion problems. Soils formed from granitic rock are highly erodible and prone to deep gullying from surface runoff; a significant area of these soils is located near West Fork Evans Creek, as indicated in Figure 2-2. Soils formed from weathered tuffs and breccias are often unstable and easily eroded. Soils formed in serpentine have high clay content, shallow profiles, and restricted vegetation due to magnesium toxicity, also resulting in erodible soils.

WATER RESOURCES

The project area includes three major drainage basins: the Willamette, the Umpqua, and the Rogue. Major stream crossings would include Calapooya Creek, the North and South Umpqua Rivers, Cow Creek, Evans Creek, and the Rogue River, as well as numerous small streams (Table 2-1). The route would pass within 5 miles of several lakes and

TABLE 2-1

MAJOR STREAM AND RIVER WATERSHEDS POTENTIALLY CROSSED BY THE PROPOSED TRANSMISSION LINE

Coast Fork Willamette Basin	Rogue Basin
Spencer Creek	Grave Creek
Silk Creek	West Fork Evans Creek
Cedar Creek	Battle Creek
Coast Fork Willamette River	Evans Creek
	Sams Creek
Umpqua Basin	Rogue River
	Rock Creek
Elk Creek	Snider Creek
Bachelor Creek	Dry Creek
Oldham Creek	Reese Creek
Calapooya Creek	Lick Creek
Sutherlin Creek	Little Butte Creek
Cooper Creek	Yankee Creek
North Umpqua River	Antelope Creek
Oak Creek	Whetstone Creek
North Fork Deer Creek	
South Fork Deer Creek	
North Myrtle Creek	
South Myrtle Creek	
South Umpqua River	
O'Shea Creek	
Canyon Creek	
Cow Creek	
Starveout Creek	

reservoirs, including Cottage Grove Reservoir. The route would also cross approximately 1/2 mile of wetlands, consisting primarily of open water and sand and gravel bar areas of streams crossed by the route and a wetland just south of the North Umpqua River crossing. Most wetlands are small and spanned by the existing transmission lines.

Water use includes domestic and industrial use, irrigation, hydropower generation, and recreation. Existing water quality in the project area is generally good, although selected streams have turbidity, sediment, temperature, and/or nutrient problems, including West Fork Evans Creek, Evans Creek, and Bear Creek. Logging operations have contributed to increased sedimentation and turbidity in some areas.

VEGETATION

The Eugene-Medford corridor traverses three major vegetation zones: Interior Valley, Mixed Conifer, and Western Hemlock (Franklin and Dyrness 1973). The preferred corridor would cross 66, 63, and 18 miles of these zones, respectively. The general distribution of these zones within the project area and the existing land cover within approximately two miles of the Eugene-Medford corridor is provided in Chapter 3 of the Technical Investigations Report.

The Interior Valley Zone is the driest and warmest of the three vegetation zones in the project area. It contains four vegetation types including grasslands, chaparral, oak forests, and conifer forests. Grasslands occupy much of the zone occurring on areas incapable of supporting tree growth because of moisture or soil conditions and on areas previously cleared or burned for agricultural purposes. Many lowland hills and some valley bottoms within the zone are occupied by oak woodlands, while Douglas-fir dominated conifer forests occupy most of the foothill areas. Chaparral communities are represented only in small areas, primarily in the Rogue River Valley.

The Mixed Conifer Zone is present at elevations ranging from about 2,000 to 4,500 feet in the southern portion of the project area. It is intermediate between the Interior Valley and Western Hemlock Zones in terms of precipitation and temperature. The zone is dominated by conifer forests containing Douglas-fir, sugar pine, ponderosa pine, incense cedar, and other species. Most forests are second-growth; however, small patches of old-growth occur, primarily along the corridor between the South Umpqua River and Evans Creek. Serpentine areas, which contain unusual floras, occur locally along the corridor within this zone.

The Western Hemlock Zone ranges in elevation from about 500 to over 3,000 feet within the northern portion of the project area, and represents the wettest zone crossed by the route. Vegetation along the route consists almost entirely of Douglas-fir dominated second-growth forests.

Small areas covered by riparian and wetland vegetation are scattered throughout the project area in narrow corridors along streams, along the margins of reservoirs and ponds, in lowland areas where the water table is near the surface, and on poorly drained upland soils. A variety of tree and shrub species typically dominate the riparian areas while the wetland areas are characterized by herbaceous species.

No plants listed or proposed as threatened or endangered under the federal Endangered Species Act occur in the project area; however, several species identified as candidates for listing occur in the project area and two species - Phacelia capitata and Sidalcea campestris - were found within the right-of-way of the preferred alternative (see Technical Investigations Report, Chapter 5). Another candidate species - Limnanthes floccosa ssp. grandiflora - is expected to occur within the right-of-way of Options H, I, L, and M in the White City-Agate Desert area.

WILDLIFE

Hundreds of species of wildlife are present at least along portions of the routes being considered (see Chapters 4 and 5, Appendix C and Technical Investigations Report), due to the length of the Eugene-Medford route and the variety of habitat types crossed. Because of their recreational or commercial importance or their special habitat requirements, the black-tailed deer, Columbian white-tailed deer, bald eagle, osprey, spotted owl, waterfowl, salmon, and trout are considered the most important species.

The black-tailed deer is common throughout the Eugene-Medford area and represents the most important big game species likely to be affected. Three important winter ranges would be crossed by routes being considered in the Medford area (Figure 2-2).

An isolated population of Columbian white-tailed deer, a federally listed endangered species, is found along the existing line near Roseburg (Figures 2-1 and 2-2). This population presently numbers approximately 2,000 to 2,500 animals (Smith 1981a).

The bald eagle, federally classified as a threatened species in Oregon, regularly occurs in low numbers along most of the large reservoirs and river systems in the project area, primarily in winter. No verified nest or roost sites occur near any of the routes under consideration, although nesting is suspected to occur at several locations in the vicinity.

The spotted owl, which is classified as threatened by the Oregon Department of Fish and Wildlife, occurs very locally along the preferred route and is associated with old-growth forests. At least three pairs have been located within 2 miles of the route south of Canyonville (Figure 2-2) (USDI BLM 1979a).

Ospreys summer along all the major river systems and larger reservoirs of the project area. Nesting occurs at many locations where snags or other suitable structures are available for nest support.

A variety of waterfowl occur in the project area. Substantial populations occur at Fern Ridge Reservoir and adjacent areas northwest of Lane Substation during winter and migration periods. Historically, large numbers of waterfowl used the Camas Swale area, but changing land use practices in recent years have substantially reduced habitat quality so that only limited numbers of waterfowl presently use the area (Greer 1981). No large concentrations occur elsewhere along the transmission line, although moderate numbers occur in the Medford area, especially along the Rogue River and its associated sloughs and oxbows.

Anadromous and resident salmonids, including chinook and coho salmon and steelhead, resident rainbow, and cutthroat trout occur in all large and many small streams of the project area. Steelhead trout and chinook salmon provide particularly important sport fisheries in the Umpqua and Rogue River Basins.

CULTURAL RESOURCES

An archaeological, architectural, and paleontological survey of the proposed transmission corridor from Creswell to Ramsey Canyon was conducted. The survey (Connolly et al. 1982) consisted of background research, a check of records of previously recorded sites (including the National Register of Historic Places and the Oregon Statewide Inventory of Historic Places), and on-the-ground inspection of the project area.

The archaeological component of the survey included a walkover of those portions of the project area (approximately 37 percent of the preferred alternate) determined by BLM in conjunction with the State Historic Preservation Officer (SHPO) to be "culturally sensitive," and subsurface testing of specific predicted site locations. Culturally sensitive areas included the floodplains and adjacent open valleys of the primary streams within each drainage, where prehistoric villages were likely to be situated, and locations with apparent food resource potential such as camas fields and streams. (These same areas have also been the most important to historic-period occupants of southwest Oregon for farming, ranching, and mining activities). Areas excluded from the pedestrian survey were those previously examined by BLM District Archaeologists and those areas considered by BLM and the SHPO to be unlikely to contain cultural resources. Those areas included densely forested and deeply dissected mountainous terrain through which travel is extremely difficult and resource potential for cultural sites is low. Because survey efforts were concentrated primarily on the valley floors where the ground surface is less obscured by vegetation, no regular shovel testing or surface clearing was necessary.

The study area for the historic and architectural resources inventory was defined to include one-half mile on either side of the centerline of the the transmission corridor. This was done to ensure that structures standing outside the project right-of-way, but which might be visually impacted, would be identified.

The survey identified a total of two prehistoric sites within the project area. One of these is a site recorded with the Oregon Archaeological Survey in 1977 and designated 35-DO-61. The site may cover an area as large as 200m X 150m. Deposits containing artifacts (including projectile points, beads, arrow shaft smoothers and broken pestles) may extend to a depth of two meters. The extent of the site and the variety of cultural material reportedly recovered suggest that it could be a major prehistoric village. The second site, discovered during the survey, has been designated 35-DO-199. It consists of a chipped stone scatter of unknown cultural affiliation covering an area of approximately 60m x 80m.

Thirty-seven historic sites were identified within one-half mile of the project centerline. However, only one of these, the Weaver Farm, appears to be potentially eligible for the National Register, according to the University of Oregon. The Farm consists of a house, an outbuilding, and a barn. The house was erected in 1873 and is one of the oldest houses in the South Umpqua area. Its style of construction and its integrity make it one of the best preserved houses of its kind in Douglas County.

A literature and field review was conducted for the portions of the project area north of Creswell (Eugene area) and south of Ramsey Canyon (Medford area). Information on previously recorded sites contained in the files of the Oregon Archaeological Survey, the Oregon State Museum of Anthopology, the Oregon SHPO, and Lane and Jackson County Planning Departments was compiled. The National Register of Historic Places, the Oregon State Inventory of Historic Places, and General Land Office maps from 1855 were also consulted for the Eugene area. An on-the-ground assessment of identified properties was also conducted to determine the potential for visual impacts on identified sites, but a further survey of the selected project route is planned. This should permit the identification of all previously unrecorded cultural resources in the project area.

RECREATION RESOURCES

Two types of recreation resource areas have been identified along the routes of the proposed transmission line alternatives and options, and have been located on Figures 2-1 and 2-2. The first involves designated parks and recreation sites that would be crossed by a transmission route segment or from which the transmission line would be visible. These are frequently points or small areas at which recreation is concentrated and is a principal land use. The second

type of recreation resource area includes travel routes, rivers, and other features or areas where dispersed recreation is a major incidental use, but which are not formally set aside for this purpose.

RECREATION SITES

Descriptions of all parks and recreation sites from which the existing 230 kV line is visible and discussions of the relative visibility of the line from these sites are contained in the Technical Investigations Report and Appendix B.

The preferred alternative and Alternatives 2 and 3 all would cross the Ridgeline Trail being developed by the City of Eugene. Land acquisition for the trail has not yet included the points where the trail will cross the BPA transmission corridor between Twin Oaks and Spencer Switching Station. The trail will apparently follow existing roads (Dillard and South Willamette) at these crossing points, where the topography exposes trail users to long views down the existing transmission lines and cleared rights-of-way. The route of the transmission alternatives also would cross two proposed Oregon Recreation Trails (Remington 1982). The Spencer-Dixonville segment would cross the future location of the High Divide Trail near the Lane/Douglas County line (Figure 2-1), while the Dixonville-Ramsey Canyon segment would cross the future location of the Rogue River Trail near the Douglas/Jackson County line (Figure 2-2).

The alternatives would be visible to some degree from 12 designated parks or recreation sites: Spencer Butte, Mount Pisgah, Ridgeline Trail, Cottage Grove Lake (three separate sites), Whistler's Bend Park, North Myrtle Creek Park, Elderberry Flats Recreation Area, Takelma Park, Agate Lake, and Roxy Ann Peak. The line would be clearly visible and prominent occurring within one-half mile of views from Ridgeline Trail, Whistler's Bend Park, and Takelma Park. At the other sites, the line would be visible in the distance, over 1-1/2 miles away, or would largely be screened from view by vegetation or topography.

Options H, I, and the ultimate development Options L and M would follow an existing transmission corridor through the Medford Basin across two parks or recreation sites: Hoover Ponds, which is undeveloped, and Medford Sports Park, which has extensive facilities for active recreation that includes drag racing and target-shooting. These options would also cross the north and east slopes at the base of Lower Table Rock, which is maintained as a natural area by BLM and the Nature Conservancy and which is also used for passive recreation, although formal public access has not yet been provided. These route options would also be visible from Agate Lake, Roxy Ann Peak, and Upper Table Rock.

DISPERSED RECREATION

Dispersed recreation in the study area includes such activities as hunting, fishing, river floating, sightseeing, and driving for pleasure, often in connection with visiting the national forests and Crater Lake National Park in the Cascades. The quality and character of views from major designated scenic highways is a significant element in these dispersed recreation activities.

The preferred alternative and Alternatives 2 and 3 would be visible from Interstate 5 at three locations indicated in Figures 2-1 and 2-2, but would be prominent only at the crossing south of Cottage Grove. Four other scenic routes would be crossed by the preferred route: the highways along the North and South Umpqua Rivers, Crater Lake Highway south of Shady Cove, and Highway 140 east of Brownsboro.

Among the options, Option C (Spencer-Alvey) would be visible from I-5 at Alvey Substation, Option E would be visible from I-5 for a number of miles in the Canyonville area, and Options H, I, L, and M would be visible from the Crater Lake Highway at White City. This last area, however, is not particularly scenic. In comparison with the preferred alternative, Option D would greatly reduce the length of the North Umpqua Highway (Route 138) from which the line would be visible, while Option E would increase the visibility of the line from Interstate 5 near Canyonville.

The preferred alternative and Alternatives 2 and 3 would cross the North Umpqua River at a stretch identified by the State of Oregon as having potential for Scenic Waterway designation. While the State Transportation Commission reviewed the study and chose not to continue the designation process for the North Umpqua River (Lilly 1981), the river is heavily used for recreation. This reach of the North Umpqua was not included in the Phase I inventory of potential national wild, scenic, or recreational rivers by the former Heritage Conservation and Recreations Service. The preferred alternative, Alternatives 2 and 3, and the options for the Medford Basin would also involve an overhead or underground crossing of the Rogue River, which is a major recreation resource. The portion of the Rogue which traverses the Medford Basin is not eligible for the National Wild, Scenic, and Recreation River System because of the extent of development along its banks nor is it being considered as a state Scenic Waterway, but it receives high levels of recreation use.

VISUAL RESOURCES

The visual environment has been described and discussed in detail in Appendix B and the Technical Investigations Report (Chapter 6). Although no areas crossed by the alternatives and options are classified as Visual Resource Management Class 1 areas by BLM planners,

Class 2 and 3 areas are of considerable extent. These classifications represent a determination by BLM that visual resource considerations are important in these areas.

The existing environment in the study area varies considerably in visual character, from suburban areas and commercial strips to pastoral landscapes set in narrow valleys and large expanses of rugged forest land. The environment through which the line would pass is predominantly rural. Many areas are important for dispersed recreation or as transitional zones between developed areas and the more spectacular scenery of the high Cascades. Other areas have important physical features or landmarks, such as Spencer Butte, Roxy Ann Peak, the Table Rocks, the North and South Umpqua Rivers, the Rogue River, and Cottage Grove Reservoir. These features are generally valued for their existing visual character and lack of signs of development, as are many of the small valleys traversed by the line. The topography of several of these features also provides extensive views of surrounding areas.

The established visual character of the developed areas adjacent to the larger towns and other settlements may also be important to local residents, although the scenic quality of these areas is often rated as moderate or even low, using the BLM Visual Resource Management System.

LAND USE

Existing land uses and land use patterns between Eugene and Medford and along the transmission route segments are described and discussed in the Routing Study Report, Technical Investigations Report, and Appendix B of this EIS.

Land uses in the area vary widely, including commercial forestry in the hills; farms and ranches in the small valleys and more open flat plains; scattered rural residences; and suburban subdivisions and urban and industrial development in the vicinity of Medford and Eugene. Land use trends near these two cities appear to favor the continued extension of large lot (1 to 10 acres or more) rural development and the decline of commercial agriculture, except for orchards. However, small-scale farming and animal husbandry for personal use is extensive in the rural residential areas.

Specific land use features of concern are identified in Figures 2-1 and 2-2, primarily consisting of residential areas adjacent to the existing corridor. The numbers of houses within 1,000 feet of the existing and proposed corridors were estimated from air photography and field surveys, and are cited in Appendix B and the Technical Investigations Report. Only those areas with a concentration of 10 or more houses within this zone, or with houses along the edge of the existing right-of-way, are noted on these maps.

Other developed land uses occur in limited areas along the routes of the project alternatives and options. These include several commercial buildings located immediately north of Dixonville Substation. A school is also located immediately south of this substation. Other commercial structures, a planned commercial development, and a number of light industrial structures are located in the area where the existing Medford Basin corridor (Options H, I, L, and M) crosses Highway 62 at its junction with Highway 140 in White City. A sand and gravel extraction operation is also located on the south bank of the existing Rogue River crossing; this operation will be extended to the north bank of the river under the terms of a recent conditional use permit. Finally, the existing Medford Basin corridor passes within several miles of the Medford airport and parallels a small private landing strip immediately north of Table Rock Switching Station.

AGRICULTURAL

The proposed route for the three Eugene-Medford transmission alternatives would pass through a number of agricultural areas. Various agricultural activities are conducted in almost all of the valley areas that would be crossed by the route. North of Ramsey Canyon the dominant agricultural uses consist of pasture land and hay and grass-seed production, as there are few orchards or fields of row crops in this area. Farming in the Medford Basin is much more extensive and diverse, with large areas of irrigated land and numerous orchards and fields of other more highly-valued crops. In the Eugene routing area, farmlands are concentrated in the valleys of Spencer and Camas Swale Creeks, and in Camas Swale itself. Farmlands in the Medford area are distributed along the Rogue River and its tributary streams, including Little Butte Creek, in lower Sams Valley, and near Eagle Point.

In addition to identifying agricultural areas and corresponding types of production along the route, lands within the proposed corridor were also classified according to their potential agricultural capability. This was done to comply with the requirements of the National Environmental Policy Act and subsequent Council on Environmental Quality memoranda (to heads of federal agencies, dated August 30, 1976 and August 11, 1980) concerning analysis of effects on farmlands, particularly prime and unique farmlands and other specially designated farmlands. Using data and maps from the U.S. Soil Conservation Service and county planning departments, the agricultural capability levels of lands along the proposed route were determined and classified as prime agricultural soils, other agricultural soils, and nonagricultural soils (refer to Chapter 6 of the Technical Investigations Report for a more complete description of data sources, methodology, and definitions). This classification of soils as prime or other types of farmlands is based upon potential soil productivity, as opposed to current production; some lands along the route which are classified as farmlands are actually forest or grasslands, but could be used as

cropland. Soils classified as prime farmlands are concentrated in the stream valleys of Lane County and in the Medford Basin, distributed in general correspondence to the farmland areas mentioned above. The proposed route does not cross any prime farmlands in Douglas County.

FOREST LANDS

The proposed Eugene-Medford route would cross lands which are predominantly forested. Various types of forest and woodland communities occupy most of the upland areas between Lane Substation and Canyonville, with farmlands or grasslands on the valley bottoms. Forest cover is virtually continuous from Canyonville to Ramsey Canyon, and is the dominant vegetative type in the hills flanking the Medford Basin.

The productive capability of forest lands along the routes of the alternatives and options was identified according to site class, as described in the Technical Investigations Report. Roughly three-fifths of the total potential route mileage was determined to be commercial forest land of Site Class 5 or better, capable of producing 50 or more cubic feet of wood per acre per year. More than half of this commercial forest land consists of less productive Class 4 and 5 sites, with productive capabilities ranging from 50 to 119 cubic feet per acre per year.

Forest productivity tends to decrease from north to south along the route, due to prevailing climatic and other site conditions. Forest sites in the Lane County portion of the route are primarily Class 3 (120 to 164 cubic feet) lands, with a few small parcels of Class 2 (165 to 224 cubic feet) land. The new corridor routing option for the Eugene area (Option B) would pass primarily through Class 3 forest land, although little of the forested land around Eugene appears to be actually committed to forestry. Forested lands from the Elkhead area to Ramsey Canyon are predominantly Class 4 and 5 sites, with Class 3 sites generally limited to some of the northerly slopes. Most of the route for Options H and L between Ramsey Canyon and Sams Creek is Class 4 and 5 land. The Medford Basin portion of the preferred alternative has isolated upland patches of Class 5 timber (and large areas of noncommercial timber), while the existing corridor (Options I and M) is essentially devoid of commercial timber below Ramsey Canyon.

FLOODPLAINS

The Eugene-Medford corridor includes a total of 14 separate crossings of 100-year floodplains between Lane and Meridian Substations (see Section 6.4 of the Technical Investigations Report), according to the official Flood Hazard Boundary Maps or Flood Insurance Rate Maps for the project area (Federal Emergency Management Agency 1981; USDHUD 1978a, 1978b). The combined length of these floodplain crossings along

the preferred alternative is about 2.9 miles. The longest of these crossings, each about .6 miles in length, would be at the South Umpqua and Rogue Rivers. All of the remaining crossings are .3 mile or less in length. The Medford area routing options would involve different stream crossings, while the total floodplain mileage for Options H, I, L, and M would be slightly greater than for the preferred alternative.

ECONOMIC CONDITIONS

Economic activity in Douglas, Jackson, Josephine, and Lane Counties is centered on forest products, although other types of manufacturing, agriculture, recreation and tourism, and education are also important activities. Combined non-agricultural wage and salary employment for the four counties reached 200,440 workers in 1980, with individual figures ranging from 23,430 in Josephine County to 103,200 in Lane County (Oregon Department of Human Resources, Employment Division 1981). Average annual employment growth rates for the decade of the 1970s were rapid, ranging from 3.3 percent per year in Douglas County to 6.0 percent per year in Josephine County (see Technical Investigations Report, Table 7-5). The overall rate for the four counties combined was 4.3 percent per year. Most of this growth can be attributed to the maturing of the local economies and resultant rapid expansion of the non-manufacturing sectors, particularly trade and services.

Unemployment rates in southwestern Oregon were comparatively high throughout the 1970s, despite the strong employment growth. All four of the counties had average annual unemployment rates of greater than 8.0 percent for the decade, while the rates for 1980 ranged from 9.8 percent in Lane County to 13.0 percent in Josephine County (Oregon Department of Human Resources, Employment Division 1981). Per capita income levels in the region were noticeably below that for the State of Oregon, while income growth in Josephine County lagged behind statewide income growth during the 1970s (Oregon Department of Economic Development 1981).

Evaluation of the potential economic effects of the no action alternative requires consideration of economic impacts on Pacific's service area in southern Oregon and northern California (Pacific's Southwest Division, except Coos Bay). The Oregon portion of the service area includes parts of Coos, Douglas, Jackson, Josephine, Klamath, Lake, and Lane Counties. California counties partially within the service area include Del Norte, Modoc, and Siskiyou Counties. Pacific's current forecast for the service area includes a 1981 total population figure of 426,314 persons (Pacific 1982a). The Oregon portion of the service area accounted for 91 percent of the total, or about 389,000 persons, while the California population in the service area was estimated at about 67,300 persons. Total employment in the service area for 1981 was estimated at 165,096 workers, with respective Oregon and California shares of 85 percent and 15 percent.

SOCIAL CONDITIONS

The total population for Douglas, Jackson, Josephine, and Lane Counties was 560,250 in 1980, as shown in Table 2-2, a figure equal to 21.3 percent of the total Oregon population. The 1980 population figures for the four counties ranged from about 58,800 in Josephine County to over 275,200 in Lane County. Population growth in this area has been relatively rapid during the past two decades, as the combined population of the four counties increased by 2.2 percent per year from 1960 to 1970 and 3.0 percent per year from 1970 to 1980. While Josephine County has exhibited the most rapid growth rate, most of the population growth occurred in Jackson and Lane Counties.

The transmission routes being considered generally would pass through sparsely populated forest and agricultural areas. Exceptions include pockets of rural residential development, such as the areas south of Eugene, west of Cottage Grove, near the North Umpqua River, and at several places in the Medford Basin. The proposed transmission line would not be isolated from population and service centers, despite the low population density in the areas near the corridor. The transmission corridor between Eugene and Medford is roughly parallel to and within relatively short driving distance of 24 incorporated communities located in the Interstate 5 corridor.

TABLE 2-2
COUNTY POPULATION GROWTH: 1960-1980

County	1960	1970	Percent Change (Annual Rate) 1960-1970	1980	Percent Change, 1970-1980
Douglas	68,458	71,743	0.5	93,748	2.7
Jackson	73,962	94,553	2.5	132,456	3.4
Josephine	29,917	35,746	1.8	58,820	5.1
Lane	162,890	213,358	2.7	275,226	2.5
Total	335,227	415,400	2.2	560,250	3.0
Oregon State	1,768,687	2,091,385	1.7	2,632,663	2.3

Sources: U.S. Department of Commerce, Bureau of the Census. 1971. 1970 census of population. Washington, D.C.
_____. 1981. 1980 census of population and housing, advance reports. Washington, D.C.

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter presents the findings of impact analyses undertaken in each subject area. Only resources which are affected are discussed, while other considerations such as climate and geology which are not affected by any of the alternatives and options are omitted. The reader should refer to corresponding sections in Chapter 2 and to Figures 2-1 and 2-2 for a description of the environment where these impacts occur.

This chapter is organized so that each resource category is addressed in a separate section. In these sections information characterizing the environmental consequences of the alternatives and options is presented. The manner of presentation varies from section to section, however, and each section is organized with the intent to clearly and briefly present important findings. In general, this is accomplished by defining terms and describing environmental consequences applicable to all alternatives and options in the beginning of the section. This is followed by a discussion of the preferred and other alternatives and then the options. In all discussions, if facts can be more briefly and clearly presented by comparing them to information presented earlier, this is done. Similarly, if a particular resource is unaffected by one of the alternatives or options it is not discussed.

In general, impacts are quantified; in cases where impacts are qualitative or cannot be readily quantified, estimates of the significance of impacts are made in accordance with NEPA regulations (40 C.F.R. 1508.27). Two factors, context and intensity, are considered in determining significance. Briefly, context refers to analyzing an action or potential impact from several different viewpoints or perspectives. Thus, national, regional, and local impacts are considered as well as short-term (less than 1 year) and long-term effects. Intensity refers to evaluating the severity of the impact according to various disciplines and types of effects, e.g., public health and safety, biological, cultural, historical, land use effects, human environment, cumulative impacts, endangered species, etc.

In this document, significance is placed in one of three categories: highly significant, moderately significant, and insignificant. Designations of significance can be based on a single factor or on a cumulation of factors, such as adverse and beneficial impacts which, considered together, result in a particular level of significance. Thus, the extent to which these factors are affected can be used in determining the level of significance. Preparers are guided by the CEQ regulations and the relative importance of various factors affecting the analysis within their particular discipline. For example, in the visual analysis section both the context and intensity of impacts are considered in evaluating impacts at the Rogue River crossings. At both the existing and preferred alternative crossings of the Rogue, the river itself is recognized as an important regional resource. It is

also recognized that impacts to it would be long-term; hence the impact of each crossing is significant from the standpoint of context. The intensity of impacts at the existing crossing, however, is not significant, largely because of the presence of the existing line. The intensity of impacts at the preferred alternative crossing, however, is significant. This is true, in spite of measures taken to limit its impact, because of the area's high scenic quality. Although the significance of impacts is identified in this chapter, other impacts which are not significant are also analyzed in this section. This impact information is used in Chapter 1, where impacts are presented in comparative form in Tables 1-4, 1-5, and 1-6, and in the accompanying narrative.

Several of the impact discussions center on various aspects of land resources, such as vegetation, land use, and soils and forest productivity. Many of the data used in these analyses relate to compilations of existing land cover types. Tables 3-1 and 3-2 provide tabulations of land requirements of the alternatives and of the options and corresponding parts of the preferred alternative for each of five broad land cover types. Included are land requirements for new rights-of-way, new clearing, and new access roads.

AIR QUALITY

Several activities associated with transmission line construction can cause particulate matter and gases to enter the atmosphere and degrade air quality. Particulate matter originates from smoke from open burning of waste vegetation as well as from dust generated by construction activities. Gaseous hydrocarbons and oxides of sulfur and nitrogen are emitted from vehicle exhaust and open burning. The impact that these air pollutants have on sensitive persons or crops depends on topographic and meteorological factors, as well as the amount of each pollutant emitted. Construction impacts are characterized by local air quality degradation during the period when equipment operation or slash burning is occuring at a given location. The project alternatives differ slightly in air quality impacts. In general, impacts increase as the amount of clearing required increases because more construction activity and vegetation burning increases emission levels.

Transmission line construction and resultant slash burning might cause intermittent exceedences of the 24-hour Oregon ambient air quality particulate standard, but would not lead to monthly or annual particulate levels above these broader standards. No regulations have been proposed or drafted which would specifically regulate the air quality impacts of such construction activity. Impacts of construction and operation of the proposed line would be below threshold levels which generally require an analysis or permit by air pollution control agencies.

TABLE 3-1

LAND REQUIREMENTS OF THE PREFERRED ALTERNATIVE
AND ALTERNATIVES 2 AND 3
BY LAND COVER TYPES[1/]

Land Cover Type	Agency Preferred Alternative	Alternative 2 Parallel	Alternative 3 Double Circuit
	New Right-of-Way (Acres)		
Urban	0	22	0
Agricultural	97	251	97
Grassland	85	261	85
Forest	1,121	1,979	1,121
Riparian/ Wetland	20	30	20
TOTAL	1,323	2,543	1,323
	New Cleared Right-of-Way (Acres)		
Forest	790	1,539	790
Riparian/	12	17	12
TOTAL	802	1,556	802
	New Access Roads (Miles)		
Urban	0.1	0.2	0.1
Agricultural	0.0	0.0	0.0
Grassland	7.6	9.1	7.6
Forest	109.2	119.1	109.2
Riparian/ Wetland	1.1	1.2	1.1
TOTAL	118.0	129.6	118.0

1/ Sources: U.S. Geological Survey Land Use and Land Cover Maps for the Roseburg, Oregon (1974) and Medford, Oregon (1974-75) 1:250,000 quadrangles supplemented by interpretation of August 1980 aerial photography.

TABLE 3-2
LAND REQUIREMENTS OF THE OPTIONS COMPARED
WITH THE PREFERRED ALTERNATIVE BY LAND COVER TYPES 1/ 2/

	Option A Lane-115 kV	Preferred Alternative	Option B Lane-Camas Swale	Preferred Alternative	Option C Alvey-Spencer	Preferred Alternative
			New Right-of-Way (Acres)			
Urban	0	0	0	0	0	0
Agricultural	0	26	37	26	0	26
Grassland	0	29	43	40	10	29
Forest	0	59	179	70	20	59
Riparian/Wetland	0	0	0	0	0	0
TOTAL	0	114	259	136	30	114
			New Cleared Right-of-Way (Acres)			
Forest	0	47	133	53	16	47
Riparian/Wetland	0	0	0	0	0	0
TOTAL	0	47	133	53	16	47
			New Access Roads (Miles)			
Urban	0.0	0.0	0.0	<0.1	0.0	<0.1
Agricultural	0.0	0.0	0.0	0.0	0.0	0.0
Grassland	0.3	0.6	2.7	1.1	0.2	0.7
Forest	0.6	1.2	15.6	1.9	0.4	1.6
Riparian/Wetlands	0.0	0.0	<0.1	<0.1	0.0	0.0
TOTAL	0.9	1.8	18.3	3.0	0.6	2.3

	Option D Umpqua Highway Bypass	Preferred Alternative	Option E Canyon-ville Existing	Preferred Alternative	Option F Green Mt. Existing	Preferred Alternative
			New Right-of-Way (Acres)			
Urban	0	0	0	0	0	0
Agricultural	19	0	0	0	0	0
Grassland	71	0	5	0	0	0
Forest	6	0	33	57	72	146
Riparian/Wetland	0	0	0	0	0	0
TOTAL	96	0	38	57	72	146
			New Cleared Right-of-Way (Acres)			
Forest	4	0	22	41	48	104
Riparian/Wetland	0	0	0	0	0	0
TOTAL	4	0	22	41	48	104
			New Access Roads (Miles)			
Urban	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural	0.0	0.0	0.0	0.0	0.0	0.0
Grassland	2.4	0.6	0.1	0.0	0.0	0.0
Forest	0.1	<0.1	0.7	8.1	1.5	20.7
Riparian/Wetlands	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	2.5	0.6	0.8	8.1	1.5	20.7

	Option G W. Fork Evans Cr. Ramsey Canyon	Preferred Alternative	Option H West Route Medford	Preferred Alternative	Option I Exist. Corridor Medford	Preferred Alternative
			New Right-of-Way (Acres)			
Urban	0	0	0	0	0	0
Agricultural	4	8	18	34	20	34
Grassland	0	0	92	44	92	44
Forest	36	70	380	562	252	562
Riparian/Wetland	1	2	13	17	12	17
TOTAL	41	80	503	657	376	657
			New Cleared Right-of-Way (Acres)			
Forest	23	50	288	401	189	402
Riparian/Wetland	1	2	6	11	6	11
TOTAL	24	52	294	412	195	413
			New Access Roads (Miles)			
Urban	0.0	0.0	<0.1	0.0	<0.1	0.0
Agricultural	0.0	0.0	0.0	0.0	0.0	0.0
Grassland	0.0	0.0	2.0	5.2	2.0	5.2
Forest	0.7	9.9	34.0	67.5	12.9	67.5
Riparian/Wetland	<0.1	0.2	0.3	1.1	0.3	1.1
TOTAL	0.7	10.1	36.3	73.8	15.2	73.8

1/ Sources: USGS Land Use and Land Cover Maps for the Roseburg, Oregon (1974) and Medford, Oregon (1974-75) 1:250,000 quadrangles supplemented by interpretation of August 1980 aerial photography.

2/ That portion of the preferred alternative corresponding to each option.

Construction period emissions from the project would not affect the air quality status of either the non-attainment areas or the remaining areas of the region which currently meet the ambient standards. Slash burning emissions would be minimized by conducting these activities in compliance with the Oregon Smoke Management Plan, administered by the Oregon Department of Forestry. The Smoke Management Plan and permit requirements would minimize impacts by prohibiting burning during adverse dispersion conditions and by prescribing burning techniques which limit emissions. Slash burning impacts could be further reduced by allowing local residents to retrieve slash as firewood. The effect of construction and slash burning emissions upon the Eugene and Medford non-attainment areas would be imperceptible, because the activities would be dispersed and well removed from these urban areas. In summary, the air quality effects of the project upon the surrounding region would be insignificant given the existing levels of emissions from logging, agricultural activities and other sources.

All air quality standards provided by the New Source Performance Standards, National Emission Standards for Hazardous Air Pollutants or local or any other air quality emission standards do not apply to transmission line operation or construction. There are several Class I or "pristine" areas (where air quality is not allowed to deteriorate significantly) in southwestern Oregon, including Crater Lake National Park and the Mountain Lakes, Diamond Peak, and Three Sisters Wilderness Areas. All of these Class I areas are 30 or more miles from any part of the proposed route. Based upon smoke plume analyses performed by Geomet Incorporated (1978), emissions from the project would not have any impact upon these Class I areas.

Following construction, operation of transmission lines produces only minor amounts of ozone and oxides of nitrogen due to corona reactions. These pollutants have not been shown to be significantly increased in ambient concentrations by transmission line operation (Oregon Department of Energy 1980; USDI BPA 1977a; Rog 1979).

SOILS

The three primary impacts of transmission line construction associated with soils would be surface erosion of cleared areas, slope failures of cut and fill areas (landslides, slumps, etc.), and compaction. Surface erosion and slope stability problems are primarily associated with access road construction, whereas compaction is associated with use of heavy construction equipment on access roads, tower sites and construction pads.

Specific erosion problems and appropriate construction techniques associated with each soil type are presented in BLM's Management Framework Plans (MFPs) (USDI BLM 1978b, 1979b, 1980). These plans outline the standard construction techniques used by the BLM which would be followed by Pacific. On other lands, conditions of the State Site Certificate would require that similar techniques be employed.

Increased surface erosion represents the potentially most severe impact of the transmission line. Elevated erosion rates can reduce soil productivity and degrade water quality. The amount of soil erosion caused by transmission line construction is a function of soil properties, slope, vegetation, rainfall patterns, construction activities and remedial practices. Although detailed soils information is not available for the entire route it is desirable to compare the impacts of the project alternatives and options in terms of quantified estimates of soil loss. Therefore, existing erosion rates were estimated by using a generalized map of sediment yield (based on stream samples) prepared by the Soil Conservation Service (SCS) (Oregon Department of Environmental Quality 1978). The expected erosion due to construction activities was estimated by using the Universal Soil Loss Equation (USDA 1972). The methodology used for these calculations is described below.

EXISTING SOIL LOSS

The sediment yield map provides approximations of the current amount of eroded sediment reaching a waterbody for all segments of the transmission corridor. The relationship between soil loss and sediment yield is a complex function of the drainage pattern, slope, runoff characteristics and vegetation and cannot be readily defined without detailed studies. For the purposes of this analysis, it was assumed that soil loss is equivalent to twice the sediment yield (USDI BLM 1979c). By making this assumption, the existing soil loss from the proposed transmission corridor can be quantitatively estimated.

CONSTRUCTION PERIOD SOIL LOSS

Increased erosion has been shown to be caused predominantly by access road construction (Fredriksen 1970; U.S.EPA 1975). Tower sites and construction pads contribute an additional small amount of soil loss. Right-of-way clearing contributes to soil loss whenever ground cover vegetation is removed. Construction period erosion rates were calculated by estimating the increased soil loss resulting from each of the above sources according to the following methodology.

The Universal Soil Loss Equation can be used to estimate soil loss if detailed soil information is available:

$$A = R \times K \times LS \times P \times C$$

where:
- A = Computed soil loss in tons/acre/year
- R = Rainfall factor
- K = Soil erosivity factor
- LS = Length/slope factor
- P = Erosion control practices factor
- C = Cover factor

The only portion of this equation affected by soil disturbance (removal of vegetation) is the cover factor, C. The cover factors for both existing and disturbed conditions were found from tables provided by the SCS (USDA 1972). The average groundcover was assumed to be 80 percent at the ground surface, and to consist of a mixture of weeds and grass-like plants (grassland) or herbaceous and woody plants and decaying compacted duff (forest). The corresponding cover factor (from the tables) was 0.03. The percent groundcover was assumed to be 0 for the construction phase, corresponding to a cover factor of 0.45.

The construction phase soil loss was then calculated by multiplying the existing soil loss by the ratio of cover factors (0.45 divided by 0.03) which resulted in construction phase soil loss of 15 times the existing rate. This calculation was performed for all areas where the groundcover vegetation would be completely removed: tower sites, construction pads, and new access roads. Right-of-way clearing in forested areas was assumed to result in soil loss 1.6 times the existing rate (Megahan 1972). Upgrading of access roads was assumed to result in soil loss 4 times the existing rate (Brown 1971). Although this method only approximates soil loss, it provides an estimate of the increased soil loss to be expected from transmission line construction and provides a basis for comparing the project options and alternatives. The results of these calculations are presented under the subheadings Alternatives and Options.

Slope stability hazards are a major problem in areas of steep slope where soils are prone to slope failure. These problems would be minimized in these areas because the appropriate standard construction techniques described in the MFPs or the State Site Certificate would be used.

Compaction of soils by use of heavy equipment can reduce soil productivity, delay revegetation and increase erosion. Compaction is most severe in soils with a high clay content. Standard construction procedures as described in Chapter 1, the MFPs and conditions set forth by the State of Oregon would restrict equipment to the minimum area necessary and therefore confine the effects of compaction to tower and other construction sites.

Several soils crossed by the transmission corridor pose special problems for road construction. The most sensitive area is a five-mile stretch through weathered granite near West Fork Evans Creek. This area is prone to severe gullying by surface water runoff wherever vegetation is removed. Revegetation of steep slopes is difficult because of the soils' droughtiness and lack of nutrients. Special construction techniques in addition to those identified in the MFPs would be used in these areas (Shade 1982). Therefore, the resultant soil loss, which would be primarily confined to disturbed areas within the right-of-way, is not expected to be significant, although it could significantly affect water resources (see Water Resources section).

Serpentine soils have restricted vegetation due to magnesium toxicity. With the proper choice of grasses, however, revegetation would not be significantly delayed (Shade 1982). Serpentine soils occur at three sites along the proposed route and extend for less than one mile at each site: near Brushy Butte (approximately 6 miles south of Dixonville), near the Jackson/Douglas County line, and near the confluence of the West Fork Evans Creek and Evans Creek.

Soils high in clay content are generally more prone to slump failure and compaction problems than other soils. Standard construction procedures as described in the MFPs would reduce these effects to a level consistent with that of other BLM administered lands in the surrounding areas. Impacts on state and private lands would occur at the same level through conditions in the EFSC Site Certificate.

The impacts discussed in this section are associated with the construction phase of the transmission line. Soil erosion from access roads would gradually decrease as soil stabilization takes place, and within five years would be about one-third higher than undisturbed land (USDI BLM 1979c). Erosion from construction pads, tower sites and other temporarily disturbed areas would decrease more rapidly due to rehabilitation activities. Revegetation would require one to three years in these areas except those within granitic soils which could take ten years or longer to revegetate (Shade 1982).

ALTERNATIVES

The preferred alternative is expected to result in an increase in soil loss of 5,400 tons during the first year after construction. This quantity of soil would correspond to approximately 0.06 inch of soil loss on new access roads; 0.02 inch of soil loss on upgraded access roads; and less than 0.01 inch of soil loss within the right-of-way corridor.

Alternative 2, the parallel alternative, would result in approximately 5,900 tons of additional soil loss in the first year after construction.

Alternative 3, the double circuit alternative, is expected to increase soil loss by approximately 5,400 tons during the first year after construction.

Because of the short duration of increased soil erosion (less than 3 years except in granitic soils), and the levels of soil loss involved, the soil impacts of each alternative would be insignificant.

OPTIONS

Option A, Lane-Twin Oaks, would result in approximately 20 tons less soil loss during the first year than the corresponding portion of the

preferred alternative. Option B, Lane-Camas Swale (new corridor), would result in approximately 160 tons more soil loss during the first year than the preferred alternative. Option C, Alvey Substation-Spencer Switching Station, would result in approximately 70 tons less soil loss during the first year than the corresponding portion of the preferred alternative. Option D, North Umpqua Highway bypass, would result in approximately 40 tons additional soil loss during the first year after construction as compared to the preferred alternative.

Options E, F, and G all represent routes through existing corridors as opposed to new and straighter routes of the preferred alternative. The preferred alternative generally involves passing directly over ridges rather than following topographic contours. In all three cases, the options result in less soil loss (about 170, 480, and 230 tons during the first year) than the corresponding portions of the preferred alternative.

Options H and L in the Medford Basin would result in approximately 690 tons less soil loss during the first year than the corresponding portion of the preferred alternative. Despite the more rugged terrain in this area, this route would not result in greater soil loss than the preferred alternative, due to its shorter length and location on relatively mild slopes along the ridgeline. Option L, the ultimate development option, would have the potential for additional impacts in the future with the construction of a second Eugene-Medford line.

Options I and M, along the existing corridor in the Medford Basin, would result in approximately 1,570 tons less soil loss during the first year than the corresponding portion of the preferred alternative. These options would, however, pass through an area of high bedrock slide potential just south of Ramsey Canyon. Appropriate engineering techniques and siting procedures would be used to minimize bedrock slide hazards, reducing them to an insignificant level. Future impacts of Option M are also possible and would be dependent on the amount of access road construction and clearing at that time.

Option J, an underwater crossing at the Rogue River, would cause erosion of the stream channel and banks during the construction phase as a result of cable burial. After the construction phase, erosion impacts would be insignificant unless cables need to be repaired or removed during the operation of the line.

As discussed above for the alternatives, soil losses resulting from these options would not be significant.

WATER RESOURCES

The primary water resources impact of construction and maintenance of the transmission line would occur as a result of increased

sedimentation of water bodies. Increased sedimentation in streams is potentially detrimental to fish habitat, navigation channels, recreational activities and domestic water use.

The increase in sediment yield to be expected from transmission line construction have been estimated according to the methodology described in the previous soils section. The results are discussed under the subheadings Alternatives and Options. Sediment particles would be either deposited in the streambed or transported as suspended solids, depending on the particle size and water velocity. The water quality impacts that would result from the increased sediment yield have been classified as insignificant or moderately significant based on the intensity and duration of the impact. If the impact is expected to be less than 3 years in duration and not result in degradation of water quality to the extent of damaging fish habitat, recreation or other water uses, it was classified as insignificant. Standard construction procedures which include special measures for problem soils are expected to preclude the occurrence of highly significant impacts.

Sedimentation rates would be highest during the construction phase and would decrease to a base level rate when stabilization has occurred. This would take from one to three years in all areas other than the granitic soils. Revegetation in granitic soils could take 10 years or longer (Shade 1982).

The most critical areas for sedimentation occur in high erosion hazard areas where the transmission route parallels a stream bed for an extended distance. This would occur along the Coast Fork Willamette River (2 miles), Calopooya Creek (1 mile), North Myrtle Creek (3 miles), South Myrtle Creek (2 miles), Battle Creek (2 miles), West Fork Evans Creek (4 miles), and Ramsey Creek (2 miles). The area near West Fork Evans Creek would be located partially in highly erodible granitic soils where stabilization can take longer than 5 years (see soils section for discussion of granitic soils). The water quality impacts of sedimentation in this area may be locally significant because of the expected duration and intensity of the impacts. This is discussed further under the Alternatives subheading in this section and in the soils section.

Stream crossings also pose a potential sedimentation problem. The streambanks of major rivers would generally not be disturbed because the transmission towers would be set back an adequate distance from the bank and since topography is generally flat adjacent to these rivers. Smaller streams would be spanned without removing vegetation from the streambanks. From an impact assessment standpoint, the most critical stream crossings would be the small and intermittent streams crossed by access roads that require drainage systems or culverts. Pacific would follow the BLM procedures outlined in the MFPs (USDI BLM 1978b, 1979b and 1980), minimizing damage to small and intermittent streams.

Additional critical areas include marshes, springs and seeps. With the possible exception of the Rogue River crossing, these would be avoided in the proposed route by appropriate siting of transmission towers. These areas are further discussed in the Vegetation section.

The proposed route could pass through an area of cinnabar (mercuric sulfide) deposits in northwestern Jackson County. Previous studies in Douglas County have shown that mercury concentrations are consistently well below the Oregon Standard for Drinking Water in areas of cinnabar deposits (Robert E. Meyer Consultants, Inc. 1978). Transmission line construction would not result in a measurable change in mercury concentrations of affected streams (Carter 1982).

An additional potential impact of the transmission line is herbicide contamination of water bodies, discussed in Chapter 1. Based on the standard procedures presented in Chapter 1, stream quality is not expected to be affected by herbicide use. For a further analysis of vegetation management impacts see the BLM Vegetation Management EIS and supporting annual environmental assessments (USDI BLM 1978c).

None of the alternatives or options cross any navigable waters of the United States as defined by the Corps of Engineers (Steckler 1981), precluding the need for a Section 10 permit under the Rivers and Harbors Act of 1899 (Section 10.33 U.S.C. 103). A state permit required by the Oregon Division of State Lands would be obtained if more than 50 cubic yards of material is expected to be dredged, moved, or placed within the bankfull stages of any waterway of the State, regardless of navigability (Akers 1982). Other regulatory concerns relate to the potential for chemicals or other discharges to affect water resources. This should not be a concern because Pacific and BPA comply with federal, state, and local regulations pertaining to herbicides, insecticides, fungicides, and rodenticides used in their construction and maintenance activities. These regulations include those enforcing the Federal Insecticide, Fungicide, and Rodenticide Act (as amended) (40 CFR, Part 162); those for acceptance of certain pesticides and their use, storage, and disposal (40 CFR, Part 165); and those for protection of workers handling such pesticides (40 CFR, Part 170). Chapter V of the BPA Right-of-Way Management Standards (No. 63040-50) specifically spells out various procedures and practices used by BPA to maintain compliance with various Federal regulations.

Another substance of concern to Pacific and BPA, primarily because it is a health hazard and can contaminate water resources, is polychlorinated biphenyls (PCBs). Their processing, distribution, and use is regulated under the Toxic Substances Control Act (40 CFR, Part 761). EPA regulations on PCBs directly affect Pacific and BPA because PCBs in the past have been used as cooling and insulating agents for substation transformers and capacitors. If the no action alternative is chosen, such equipment may be needed to maintain service. For this alternative, new transformers and capacitors which would eventually be needed would not contain PCB compounds.

Pacific and BPA take care to avoid accidents or spills of pesticides, petroleum products, and other hazardous substances. In the event of a spill, however, BPA and Pacific comply with regulations governing the treatment and disposal of such substances. Depending on the substance and whether it is spilled on land or water, regulations under the Clean Water Act, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, and the Federal Insecticide, Fungicide, and Rodenticide Act (as amended) may be applicable.

A Section 404 permit (Clean Water Act, 33 U.S.C. 1344) from the U.S. Army Corps of Engineers could be required at any of the river crossing sites if fill material, including poured concrete, is placed waterward of the ordinary high water line or in adjacent wetlands. Until all tower sites and access roads are identified, specific places where a permit may be required are unknown.

The types of solid waste generated during construction and operation of transmission lines can be classified as clearing waste, construction waste, domestic (municipal) waste amd problem wastes. These wastes would be collected, transported, stored and disposed of according to applicable federal and state laws, regulations and guidelines as required under the Solid Waste Disposal Act and Resource Conservation and Recovery Act. Domestic and construction solid waste generated would be disposed of in a state approved landfill. The quantities of these wastes would be small and would not adversely affect the landfill. Certain portions (metal, rubber and paper) would be recovered for sale and reprocessed where practical.

Coastal Zone Management Program considerations are not applicable because the project area is not within the coastal zone and would not significantly affect coastal zone resources. This project would not affect a domestic water supply or a sole source aquifer as defined in Section 1424(e) of the Safe Drinking Water Act (Federal Register, February 9, 1978).

ALTERNATIVES

The preferred alternative would result in approximately 2,700 tons/yr of additional sediment yield during the first year after construction. The impact of this additional sediment would be greatest in the small streams adjacent to the corridor. An example of this situation is Packard Creek (seven miles south of the South Umpqua crossing) which parallels the corridor for most of its length (2 miles). The total existing sediment yield to this watershed is estimated to be approximately 750 tons/yr based on Soil Conservation Service sediment yield maps (Oregon Department of Environmental Quality 1978). The additional sediment yield from construction of the preferred alternative (replacement of the existing line) would be approximately 23 tons/yr, or an increase of three percent. Sediment yield would generally be greater where the corridor represents a new alignment,

rather than replacing or paralleliing an existing line. An example of a watershed crossed by a new alignment would be Yankee Creek, four miles northeast of the Meridian Substation. Sediment yield in this watershed would increase from approximately 2520 to 2640 tons/yr the first year after construction, an increase of less than five percent, indicating that, in general, sediment yield impacts to streams would be insignificant. Because these calculations have been based on generalized sediment yield values, isolated areas of highly erodible soils, such as near West Fork Evans Creek, would have higher local sedimentation rates. The expected sedimentation rates are difficult to quantify in granitic soils, but water quality impacts are expected to be moderately significant because of the longer duration of the impacts (more than 3 years) and the greater impact intensity expected in this area relative to the remainder of the route. The road construction procedures outlined in the MFPs (USDI BLM 1978b, 1979b, 1980) and the State Site Certificate would be used to minimize sedimentation rates in this area. Water quality impacts on the remainder of the route would be insignificant.

Alternative 2, the parallel alternative, would result in approximately 2,900 tons/yr of additional sediment yield during the first year after construction relative to existing conditions. This would be an insignificant impact, except in the West Fork Evans Creek area for the same reason described above.

Alternative 3, the double circuit alternative, would require the same access road mileage and clearing as the preferred alternative and would result in identical impacts.

OPTIONS

Options A through F would not cross any major water bodies. Therefore, the options which minimize the length of new and upgraded access roads would have the lowest water resources impacts as discussed in the soils section. Sediment yield is estimated to be greater for the option than for the corresponding portion of the preferred alternative for Options B and D (80 and 20 tons/yr during the first year, respectively). Less sediment yield is expected for Options A, C, E and F (10, 35, 85 and 240 tons/yr during the first year, respectively) than for the corresponding portion of the preferred alternative. The water quality impacts of each of these options would be insignificant in terms of intensity and duration, as defined earlier in this section.

Option G, West Fork Evans Creek to Ramsey Canyon, would have a direct impact on the West Fork of Evans Creek. Water quality problems already exist in this creek (Oregon Department of Environmental Quality 1978), due in part to the highly erodible granitic soils upstream and previous logging operations. Option G involves following the existing corridor along the creek bed for approximately 3 miles, whereas the preferred alternative would traverse ridges 1/2 mile to the northeast of the

creek. Sediment yields are expected to be approximately 115 tons less for Option G than for the preferred alternative during the first year. Based on the criteria defined earlier in this section, water quality impacts would be insignificant for this option.

Option H, the Medford Basin west route, is expected to result in approximately 184 tons/yr less sediment yield than the preferred alternative. Water quality would not be significantly affected.

Option I, for the existing corridor through Medford Basin, is expected to result in approximately 780 tons/yr less sediment yield than the preferred alternative. Water quality impacts would be insignificant.

Option J, an underwater crossing at the Rogue River, would cause elevated suspended sediment levels during the construction phase due to dredging for cable burial. An accidental rupture of the cable or oil spill would result in contamination of the river with cable oil. The chances of such a rupture, however, are estimated to be very low, less than one rupture during the life of the project (USDOE BPA 1981b). Available evidence indicates that the cable oils potentially used are low in toxicity (Feng 1971, Azzola 1973). Water quality impacts for this option would be moderately significant during the construction phase because increased sedimentation could damage fish habitat. Water quality impacts for transmission line maintenance would be insignificant.

The impacts associated with Options K, L, and M would be identical to those of the preferred alternative, Option H and Option I, respectively. However, each option also has a potential further impact associated with future development. This impact is not possible to assess without detailed design information, but would be similar to the impacts described above for the proposed construction activities.

VEGETATION

All project alternatives and most project options would cause vegetation impacts in agricultural land, grassland, forest land (including oak and coniferous forest), and riparian and wetland areas to varying degrees. Vegetation impacts in agricultural land and grassland would be limited to areas needed for construction equipment access, construction pads, and tower sites. Impacts on forest land, however, would be more extensive because of the added requirement for vegetation clearing to maintain minimum conductor and tower clearance with adjacent vegetation. Impacts to riparian and wetland areas along the route are avoidable to a large extent because most of these areas are small and can be spanned, and only tall vegetation which represents a hazard to the towers or conductors would be removed.

Most of the areas required for construction access, construction pads, and tower sites in agricultural land and grassland would experience

only short-term impacts because little vegetation clearing would be necessary. Approximately three acres of vegetation would be cleared in agricultural land and grassland for construction pads (two acres) and tower sites (one acre). Revegetation would occur on these sites, except for the areas occupied by tower foundations, within one to three years. No permanent access roads would be constructed in agricultural lands. A limited amount of new access roads would be constructed in grasslands requiring complete vegetation clearing and producing long-term impacts on these lands. Because of the small amount of disturbance in these areas and the short-term nature of most disturbance, vegetation impacts in agricultural and grasslands would be insignificant.

Much of the forest vegetation occupying the right-of-way would be permanently converted to a low-growing early successional plant community containing lower structural diversity, by clearing trees and subsequent control of tall-growing species. Current right-of-way management policy allows for greater structural diversity of vegetation than in the past because only tall vegetation that would potentially interfere with the conductors or towers is removed. Understory vegetation would not be cleared, but would experience some damage as a result of logging and slash burning activities. Existing access roads would be upgraded and new access roads would be constructed as required to provide for construction equipment access in forest lands. Access road construction would result in the long-term loss of all vegetation cover. All vegetation would also be cleared from limited areas for construction pads and tower sites. Regrowth of low-growing vegetation would be permitted on most of this area. Forest clearing would not be concentrated in large blocks, but would be distributed within a narrow corridor along the 147-mile route. Also, most of the forest lands potentially affected are represented by second-growth and recently cleared forests, which are abundant throughout the project area. Therefore, impacts to forest vegetation would not be significant in a regional sense.

Riparian and wetland vegetation (see glossary) comprises a small proportion of the vegetation potentially affected by the project. A limited area of riparian vegetation would need to be cleared of tall vegetation. Since many of these areas occupy valley bottoms which can be spanned without clearing, it is likely that the area requiring clearing would be minimized. Construction pads would not be located in riparian areas but towers would be sited in these areas where necessary. With the possible exception of the Rogue River crossing, all wetlands crossed are small enough to be spanned so that tower sites would not be located in them. No filling of wetlands would be required. Small perennial and intermittent streams may require the installation of culverts for access road construction. Overall, riparian and wetland vegetation impacts would be insignificant because (1) the amount of disturbance would be low relative to the availability of similar vegetation in the area; (2) the intensity of the disturbance would be low; and (3) most disturbance would occur adjacent to an existing cleared corridor.

Control of tall-growing vegetation within the right-of-way in forest and riparian areas would be practiced during operation. Selective cutting and herbicides may be used for this purpose. Aerial application of herbicides would not be used except, possibly, in the segment of the line to be constructed by BPA. Because of the controls and safeguards to be applied to herbicide use (as described in the Standard Design Features Section of Chapter 1) and the limited extent of herbicide use expected, effects of vegetation control on adjacent nontarget vegetation are expected to be negligible.

No plants officially listed or proposed for listing as threatened or endangered under the Endangered Species Act occur in the project area (Blum 1981). However, based on review of existing information, 23 species identified as candidates for listing (Federal Register, December 15, 1980 pages 82480 to 82569), at least potentially occur in the project area. Field surveys were conducted during summer 1981 to identify if and where these species occur along the existing corridor. New alignment segments of the preferred route were not surveyed since these were identified too late to be included in the summer surveys. Based on the field surveys and literature review, occurrence of eight species was judged very unlikely and two species were confirmed to exist within the right-of-way of the preferred alternative and Alternatives 2 and 3 (Table 3-3) (see Section 5.0, Technical Investigations Report).

ALTERNATIVES

The preferred alternative and Alternatives 2 and 3 would traverse approximately 14.8 miles of agricultural land, 16.5 miles of grassland, 112.4 miles of forest land, and 1.7 miles of riparian and wetland areas (plus 1.4 miles of urban areas). Clearing and new access road requirements are summarized for these three alternatives in Table 3-1.

Preferred Alternative

Minimal vegetation impacts would occur in agricultural and grassland as a result of the preferred alternative. Approximately 3 acres of vegetation would be cleared in these areas for construction pads and tower sites and about 7-1/2 miles of new access roads would be constructed in grasslands.

Trees and other tall vegetation would be cleared on approximately 790 acres of forest land for conductor clearance. Forty-nine percent of this acreage would occur along the segment between Dixonville and Ramsey Canyon and 45 percent between Ramsey Canyon and the Meridian Substation. Approximately 37 of the acres to be cleared are covered by forests of older seral stages. An estimated 109 miles of new access roads would be constructed, requiring an additional 113 acres within cleared right-of-way and 72 acres in uncleared forest land. All vegetation on about 20 acres within the cleared right-of-way would also be cleared for construction pads and tower sites.

TABLE 3-3

CANDIDATE THREATENED OR ENDANGERED PLANTS POTENTIALLY OCCURRING IN THE PROJECT AREA

Species	Probability of Occurrence On Right-Of-Way Not Found During Surveys: Occurrence Is Very Unlikely	Probability of Occurrence On Right-Of-Way Not Found During Surveys: Occurrence Is Possible	Found on R/W During Surveys
Agrostis microphylla var. hendersonii		X	
Arabis koehleri var. koehleri	X		
Arabis koehleri var. stipitata	X		
Aster vialis		X	
Cypripedium montanum		X	
Erigeron decumbens	X		
Fritillaria gentneri		X	
Lewisia cotyledon var. howellii	X		
Limnanthes floccosa ssp. grandiflora		X	
Limnanthes floccosa ssp. pumila	X		
Limnanthes gracilis var. gracilis		X	
Lomatium bradshawii		X	
Perideridia erythrorhiza		X	
Phacelia capitata			X
Phacelia verna		X	
Plagiobothrys hirtus var. corallicarpa	X		
Plagiobothrys hirtus ssp. hirtus		X	
Romanzoffia thompsonii/sp. nov. ined.		X	
Sidalcea campestris			X
Sidalcea cusickii		X	
Sidalcea nelsoniana		X	
Synthyris missurica ssp. hirsuta/ined.	X		
Thlaspi montanum var. siskiyouense	X		

A maximum of 12 acres would be cleared of tall vegetation and 1.1 miles of new access roads would be constructed within riparian areas along the preferred alternative. Less than 1/2 acre of wetlands would be affected by clearing, access roads, and tower sites, primarily at the Rogue River crossing (see Wetlands Section following).

A large population of the candidate threatened or endangered plant species -- Phacelia capitata -- was found to occur within the existing right-of-way on forest land near Brushy Butte, south of Dixonville (Figure 2-2). This low-growing perennial appears to be slowly expanding its population size on serpentine soils primarily within the cleared portion of the right-of-way in this area. The local distribution of the species extends south from Brushy Butte along the right-of-way for about 1 mile. The following special precautions would be taken to minimize impacts to this population.

New access road routes and construction pad and tower locations would be selected to avoid plant concentration areas. This would be accomplished by an on-the-ground review of detailed construction plans by a botanist, followed by modification of these plans where necessary prior to initiation of any construction activity. The same process would be followed where plant concentrations are found on existing access roads. Herbicide use for future vegetation control in this area would be curtailed.

Although some individual plants would likely be killed as a result of construction activities, the mitigation measure described above would ensure that concentration areas are avoided and thus impacts to this population would be insignificant. In the long-term, because available data indicates that the species prefers open areas, widening of the cleared right-of-way may have a positive impact on the population by increasing the area of suitable habitat.

The second candidate species found within the existing right-of-way is Sidalcea campestris. Several plants of this perennial species were found along the banks of a small stream which crosses the existing right-of-way on agricultural land near Camas Swale (Figure 2-1). Individual plants of this species were also found at scattered locations within the Camas Swale area and south to Cottage Grove. Because special precautions would be taken (as described above) near the small stream in the Camas Swale area, impacts to Sidalcea campestris should be avoided.

Alternative 2

Transmission line development under Alternative 2 (parallel) would produce greater vegetation impacts relative to the preferred alternative, but these would still be insignificant. This alternative would require acquisition of more right-of-way, clearing of more land, and construction of more miles of new access roads than any of the alternatives. Area requirements for construction pads and tower sites

would be similar to the preferred alternative. Approximately 36 percent of the 1,539 forest acres to be cleared for right-of-way occurs between Lane Substation and Dixonville, 41 percent occurs between Dixonville and Ramsey Canyon, and 23 percent occurs between Ramsey Canyon and Meridian Substation.

Approximately 38 acres of old-growth forest and a maximum of 17 acres of riparian areas would be cleared of tall vegetation under this alternative. Impacts to wetlands would be similar to those of the preferred alternative. Adverse impacts to Phacelia capitata and Sidalcea campestris would be insignificant because of the measures described above. In the long-term, Phacelia capitata may be beneficially affected due to the creation of additional suitable habitat.

Alternative 3

Vegetation impacts as a result of Alternative 3 (double circuit) would be essentially the same as for the preferred alternative. However, in the long term, if an additional 500 kV line is needed between Eugene and Medford, the cumulative impacts of two sets of 500 kV lines on double-circuit towers would be considerably less than if two parallel single circuits were constructed.

OPTIONS

The various options (A through M) would each alter the extent of vegetation impacts. The area of new right-of-way, the area of new cleared right-of-way, and the length of new access roads required for each option are compared by land cover type with that required by the segment of the preferred alternative replaced by each option in Table 3-2. The most substantial reductions in total vegetation impacts are produced by Options I, H, F, and A (in decreasing order), while the only substantial increase in vegetation impacts is produced by Option B. Options E, F, and G would reduce the amount of old-growth forest clearing by about 5, 4 and 1 acre, respectively. Option H would increase old-growth clearing by about 10 acres.

None of the options would alter impacts to the two candidate threatened or endangered plants confirmed to occur on the preferred route. However, another candidate plant -- Limnanthes floccosa ssp. grandiflora -- is expected to occur along Options H , I, L and M in the White City-Agate Desert area. This plant occurs only around the edges of vernal pools in this locale. Collection records indicate its presence in the immediate vicinity of the route and suitable habitat was observed within the existing right-of-way during field surveys in this area. Because special precautions would be taken (as described above in this area, impacts to this species should be avoided. Also, transmission line development under these options would impact the unique flora that occurs in the Agate Desert area (Oregon Natural

Heritage Program 1977). However, because of the limited amount of vegetation clearing required in this area, impacts are not expected to be significant, especially because care would be taken to avoid vernal pools.

The impacts associated with Options K, L, and M would be the same as those of the corresponding portion of the preferred alternative, Option H, and Option I, respectively, for the first 10 or 20 years following construction. However, in approximately the late 1990's or early 2000's a second 500 kV line may be built. When this occurs the additional clearing and access road construction identified in Table 1-2 as Potential Future Requirements would occur, resulting in additional vegetation impacts.

WETLANDS

The effects of the various project alternatives and options on wetlands are discussed in previous paragraphs of this section and in the Water Resources, Wildlife and Visual Resources Sections. Because wetlands impacts are of special concern, wetlands effects are summarized here. Pursuant to Executive Order 11990, transmission line facilities would not be located in wetlands unless there is no practicable alternative.

Project area wetlands were identified by examination of U.S. Fish and Wildlife Service National Wetland Inventory Maps (these were available for only a portion of the project area), U.S. Geological Survey maps, color aerial photographs, and field reconnaissance surveys (see Technical Investigations Report, Section 3.0). Although many wetlands are crossed by the various project alternatives and options, most of these are very narrow (i.e., less than 100 feet across), occurring along small streams, and can easily be spanned. Since these areas contain little tall vegetation and occur in valley bottoms only negligible vegetation clearing would be required. Access roads, which cross these areas, would be upgraded or constructed at some locations and culverts may need to be installed in some small, perennial, and intermittent streams. Although the potential effects of sedimentation resulting from construction on the water quality and substrate of streams in the project area may be important (See Water Resources Section), the other effects of road construction on these wetlands would be insignificant because of the very localized nature of the impacts relative to the length of these wetlands.

The only wetlands crossed that are wider than about 100 feet are the North and South Umpqua River crossings, a sedge-dominated wetland adjacent to a small reservoir just south of the North Umpqua River crossing, and the two alternative Rogue River crossings. All of these wetlands would be spanned by transmission line development and would not require new access road construction except for the preferred alternative crossing of the Rogue River.

The existing corridor crossing of the Rogue River would span a relatively large wetland and it may be be necessary to locate one tower in the drier portion of the wetland. Because little tall vegetation exists within the right-of-way of this alternative crossing, at most several small black cottonwoods would have to be cut for conductor clearance. Also, because of the lack of construction activity within or immediately adjacent to water bodies in this wetland and the flat topography of the area, erosion and sedimentation impacts are expected to be negligible. The incremental visual impacts of adding a 500 kV line to the existing corridor across this wetland are not expected to be significant (see Visual Resources Section). Overall, impacts to this wetland are expected to be insignificant because of the small area affected relative to the size of this wetland, and because disturbance would occur within or adjacent to an existing corridor.

One transmission line tower would probably be located within a wetland on the east side of the preferred alternative Rogue River crossing. This seasonally flooded gravel bar site is dominated by black cottonwoods and willows and is adjacent to a more extensive tract of riparian woodland. The wooded portion of this wetland covers about 10 acres. Less than one-half acre of wetland vegetation would be cleared of tall vegetation for conductor clearance. In addition, approximately one-tenth mile of access road would be constructed for access to the tower site. Erosion and sedimentation impacts are expected to be negligible for the reasons identified for the existing corridor Rogue River crossing. The overall effects of these activities on this wetland are expected to be insignificant because of the small area affected relative to the size of this wetland and because similar areas commonly occur along the river in this area. However, visual resource impacts due to 500 kV transmission line development across this wetland would be moderately or highly significant depending on the alternative and option selected (see Visual Resources Section).

Because of the limited effects on wetland vegetation, impacts on waterfowl nesting and rearing habitat would be insignificant. In addition to the direct effects on waterfowl habitat, spanning wetlands with overhead transmission lines produces a collision hazard to waterfowl. This hazard would be highest at the larger wetland crossings. Although it is likely that some waterfowl would be killed as a result of collisions, the overall impact is not expected to be biologically significant (see Wildlife Section).

As noted above, the only wetlands in which project structures would be placed are those at the Rogue River crossing. No construction alternatives exist that would avoid this crossing without greatly increasing the length of the line. It would be possible to avoid tower placement in these wetlands by increasing tower height which would permit a greater setback from the river. However, this would result in increased project costs and would increase visual impacts. This modification does not appear to be justified based on the minimal impacts associated with locating a single tower within these wetlands.

Undergrounding the preferred alternative Rogue River crossing (Option J) would modify less vegetation and wildlife habitat within the wetland at this crossing than overhead construction and revegetation would occur. Undergrounding at the existing corridor Rogue River crossing would temporarily increase vegetation and wildlife habitat loss. Approximately 0.8 acre of wetland would be cleared during construction at this location. However, revegetation of this cleared area would occur in less than 1 year following construction. Underground construction would eliminate the potential for waterfowl collisions with conductors and substantially decrease visual impacts, but would increase the potential for water quality impacts. Overall, however, wetland impacts as a result of undergrounding the Rogue River crossing are not expected to be significant at either crossing due to the limited areas potentially affected relative to the size of the wetlands involved, the frequency of occurrence of similar wetlands along the Rogue River in this area, and the short-term nature of the wetland impacts.

WILDLIFE

One of the the greatest impacts to wildlife resulting from the preferred alternative and Alternatives 2 and 3 would be habitat modification resulting from vegetation clearing within the right-of-way (Table 3-1). Impacts in agricultural and grassland habitats would not be significant because of the limited area directly affected. Similarly, impacts to riparian and wetland habitats would be insignificant because of the limited area involved and since clearing in these areas can be avoided to a large extent. Forest habitats would experience the greatest impacts because clearing is necessary not only for access roads, construction pads, and tower sites, but also to maintain minimum conductor clearance with adjacent vegetation. Therefore, low-growing, early successional plant communities would exist within a large portion of the right-of-way now containing forests. As a result of this forest habitat loss, populations of those forest-inhabiting species that do not significantly utilize early successional or forest edge habitats may decline. Examples of these species include the marten, northern flying squirrel, goshawk, and several species of owls, woodpeckers, songbirds, and small mammals. However, forest habitat clearing would not be concentrated in large blocks, but would be distributed within a narrow corridor throughout the 147-mile route. Also, the great majority of the forest lands potentially affected are occupied by second-growth and recently cleared forests, which are abundant throughout the project area. Therefore, impacts to forest wildlife, in general, are not expected to be significant in a regional sense.

Habitat modification in forested areas would also benefit some wildlife species. Because right-of-way construction in extensive forested areas creates a new habitat dominated by low-growing vegetation and increases the amount of edge, habitat diversity is increased along the

right-of-way (Maser et al. 1979). There is also evidence to indicate that where diversity has been created by a right-of-way, wildlife species diversity increases with increasing right-of-way width (Anderson et al. 1977, Schreiber and Graves 1977), suggesting that widening of the existing right-of-way along replacement and parallel portions of the route would also benefit certain species. Species that would benefit from the widening are those that prefer early successional habitats such as the brush rabbit, mountain quail, and certain songbirds and small mammals.

The overall impact of forest habitat clearing on species that utilize a variety of successional stages is difficult to predict. For example, black-tailed deer utilize dense timber for hiding and thermal cover, while early successional habitats provide a more concentrated food supply. Right-of-way clearing is likely to benefit this species in areas along the route where food supply is limited and have an adverse effect in areas with limited cover. Other species, such as many mammalian predators (e.g., bobcat, cougar and coyote), are wide-ranging with broad habitat requirements. Again, however, because right-of-way clearing would not occur in large blocks, but would be distributed within a narrow corridor extending over a large area, habitat modification impacts on these species are not likely to be significant whether negative or positive.

Construction of new access roads is another source of wildlife impacts. The area covered by access roads represents lost habitat to nearly all species concerned (Table 3-2). However, the greatest long-term impact on wildlife resulting from access road construction may be increased human access and increased use of previously remote areas (Davey 1974). Big game mammals, large predatory birds and mammals, and wild turkeys (in the Medford area) are the species most likely to be affected. Increased vehicular access intensifies fishing, hunting, and trapping pressures (Maser et al. 1979) and harassment of wildlife (Ellis et al. 1969). Impacts would be greatest along those segments where new alignments are to be followed. These include the three realignment segments between Canyonville and Ramsey Canyon and the entire segment between Ramsey Canyon and the Meridian Substation. Gates would be installed at many access points on public and private land but these generally are only partially effective at restricting vehicular access, especially by trailbikes, snowmobiles, and four-wheel drive vehicles. The three realigned segments between Canyonville and Ramsey Canyon cross commercial forest land and already contain a relatively high density of roads; no point along these corridor sections is more than about one-half mile from an existing road. The 27 miles of the Ramsey Canyon to Meridian Substation segment, however, are crossed by few existing roads. Transmission line development along this route would provide access to much of the remote area where many points along the corridor are presently more than 1 mile from an existing road. The potential frequency of human access is also expected to be higher in this segment because of its proximity to a heavily populated area and its lack of very rugged topography. The 64

miles of new access roads that would be built in this segment would also result in the long-term loss of 108 acres of wildlife habitat. For these reasons the cumulative effects of access road construction on wildlife are expected to be moderately significant in this segment. The length of new access roads constructed in new alignment corridors provides an indication of the relative severity of this impact among the various alternatives and options. These are provided in Tables 1-4, 1-5, and 1-6.

Project construction would also have a short-term impact on wildlife, particularly big game mammals and large predatory birds and mammals, during the construction phase as a result of disturbance from human activities and construction equipment. Many species occurring along the right-of-way would temporarily leave the area or otherwise modify their behavior until construction activities ceased. Construction during the spring and early summer season may negatively affect the breeding success of some species. If construction activities occur during late winter, disturbance impacts would be relatively high; however, construction activities are not expected to be scheduled during this period.

Wildlife impacts resulting from the corona effect and electric or magnetic fields are also a theoretical possibility as a result of operation of the proposed line, but so little is known about the effects of these phenomena on wildlife that the impacts, if any, are difficult to assess. The available information indicates that adverse effects on wildlife have not been conclusively proven (Goodwin 1975, Bankoske et al. 1976).

Use of herbicides for vegetation control within rights-of-way is another potential source of fish and wildlife impacts due to exposure to toxic chemicals. However, exposure to acute toxicity levels is not expected to occur because only EPA-registered herbicides would be used that would not reach toxic exposure levels when used in accordance with the manufacturer's prescription. Also, chronic effects are not expected because of the unliklihood of repeated exposures to individual animals due to the infrequent application rate anticipated. Controls and safeguards concerning herbicide use are described in the Standard Design Features Section of Chapter 1.

Virtually the entire project area is used as winter range by black-tailed deer. The BLM (1979c) has identified 11 areas as "crucial black-tailed deer winter ranges" in the Jackson and Klamath Sustained Yield Units of the Medford District. Three of these areas are crossed by the preferred alternative and Alternatives 2 and 3 (Figure 2-1). These areas are defined as low elevation lands in which deer concentrate during severe winters (Oakley 1981). New right-of-way clearing in these areas would have a positive impact on deer by promoting the production of high quality forage plants in narrow corridors and increasing the amount of habitat edge. This positive effect may be overshadowed in the West Fork Evans Creek winter range by

the loss of cover which would result from right-of-way construction since this winter range has been extensively logged in recent years. The positive and negative effects of right-of-way clearing in these winter ranges are not expected to be significant because less than one percent of each winter range would be cleared under all alternatives. The construction of new access roads in new alignment segments and the resulting increased human access would negatively impact deer on all winter ranges, especially during severe winters when the animals are concentrated and already under considerable stress. However, these new alignment segments are mostly on private lands on which access is likely to be controlled and which already contain some existing roads. Therefore, this impact is also not expected to be significant.

Spotted owl habitat may be impacted as a result of new right-of-way clearing south of Canyonville. Three spotted owl pairs are known to occur within 2 miles of the preferred alternative and Alternatives 2 and 3 in this area and two of these pairs occur within 1 mile (Figure 2-1). The BLM has proposed that approximately 4,000 acres surrounding these three pairs be designated as a Spotted Owl Management Area (Lint 1981c). Approximately two miles of the preferred alternative and Alternatives 2 and 3 would traverse this proposed management area. Because the forest habitat to be cleared under each alternative would represent less than 1 percent of the proposed management area, would occur at least one-quarter mile from the pair activity centers, and would mostly involve widening an existing cleared right-of-way, the spotted owl population is not expected to be reduced in this area (Lint 1981c).

Although extensive spotted owl surveys have been performed throughout much of western Oregon, it is possible that other, not yet located, pairs may occur near the route. Because of the limited amount of old-growth habitat available, however, it is doubtful that more than one or two additional pairs occupy areas in proximity to the route.

The potential for waterfowl mortalities as a result of collisions with conductors or overhead groundwires exists, but is not expected to be significant because of the lack of major waterfowl concentration areas along the preferred route. Greatest potential for collisions would be at the proposed crossings of the North Umpqua, South Umpqua, and Rogue Rivers, and near a small reservoir just south of the North Umpqua crossing. A study conducted for BPA indicated that transmission lines caused some alterations in bird flight behavior (Meyer 1978). Most waterfowl, however, crossed well above transmission line height and less than 1 percent of waterfowl observed altered their flight path to avoid flying across the line. Studies of 500 kV, 230 kV, and 115 kV transmission lines at several sites in Oregon and Washington have shown that less than 1 percent of those birds flying at or below ground wire height collided with the lines (James and Haak 1979, Meyer and Lee 1981). Most of these collisions were believed to occur with the small overhead ground wires rather than the larger, more visible conductors. Several BPA-sponsored studies of transmission line collision mortality

have been conducted in recent years at ten sites in Oregon and Washington (Lee 1978, Meyer 1978, James and Haak 1979, James 1980, Willdan Associates 1981, Beaulaurier 1981). Several of these sites were selected to represent "worst case" situations because of the frequent presence of large numbers of waterfowl and other birds (Meyer and Lee 1981). To date, however, the levels of avian mortality from collision with the lines studied have not been biologically significant (Beaulaurier et al. 1982). Similar results are expected with this project, especially since no large concentrations of waterfowl occur along the various project routes.

Limited amounts of waterfowl nesting and rearing habitat occur in wetlands within the project area. Because project impacts on wetlands are expected to be minimal, impacts on waterfowl nesting and rearing habitat are expected to be insignificant.

The preferred alternative and Alternatives 2 and 3 traverse the range of the Roseburg population of Columbian white-tailed deer which presently numbers about 2,000 to 2,500 animals (Smith 1981a). This subspecies is classified as endangered under the Endangered Species Act of 1973. As required by the Act, BLM has assessed the potential for impact to this population and concluded that no biologically significant impacts would occur as a result of the project due to the limited amount of habitat disruption expected compared with the total range of the population (465 square miles). BLM's biological assessment has been submitted to the USFWS for concurrence and consultation. BLM's assessment, however, concluded that the clearing required by Alternative 2 may have an insignificant negative effect on the deer. In addition, the BLM's assessment concluded that because the oak woodlands near the North Umpqua River are heavily used for fawning by the subspecies (Smith 1981b), construction activities during May 15 to July 15 may have a negative, but insignificant, effect on fawning success in this area. Current construction schedules do not include plans for activities within 1 mile of the North Umpqua River crossing between May 15 and June 15, as construction would proceed south from Spencer Switching Station. If, due to unforeseen circumstances, this schedule could not be used, Pacific would agree to a determination by the Oregon Department of Fish and Wildlife or the U.S. Fish and Wildlife Service upon their review, prior to construction, that construction should be suspended during this time period.

The bald eagle, which is Federally listed as threatened in Oregon, also occurs in the project area on a seasonal basis. It regularly occurs during the winter and spring and fall migration periods along Fern Ridge and Cottage Grove Reservoirs, and the Coast Fork Willamette, North Umpqua, South Umpqua, and Rogue Rivers and adjacent areas. Observations have also been made in the spring and summer in some of these areas and nesting is suspected but not verified at Fern Ridge Reservoir (Greer 1981), at Kelly Slough along the Rogue River (Oregon National Heritage Program 1977), and northeast of Medford between Agate Reservoir and 2 miles east of Yankee Reservoir (Werner 1982). No roost

sites are known to occur near any of the alternative or optional routes. BLM has prepared a biological assessment of the potential for project impact to bald eagles. This assessment concluded that the project would not affect bald eagles because no known nest or roost sites would be disturbed, a negligible proportion of the habitat used by eagles in the project area would be modified, eagle electrocution is not a problem with 500 kV lines, and the potential for collisions with conductors or groundwires is expected to be low. BLM's biological assessment has been submitted to the USFWS for concurrence.

Other species identified as Oregon Species of Special Concern (Donaldson 1979) may occur in the project area (see Technical Investigations Report, Section 5.0), but are not expected to be significantly impacted. These species include the pika, ringtail, fisher, and sharp-tailed snake. The pika probably inhabits talus slopes below cliffs in the southern portion of the project area. However, these areas would not be selected for tower siting or access road construction and thus, would experience negligible habitat disruption. The ringtail and fisher may also occur in the southern portion of the project area. Because the ringtail has very broad habitat requirements and the fisher occupies very large home ranges, the minimal habitat modification per mile of line is not expected to significantly affect these species. Although the sharp-tailed snake exists within the project area, no populations are known to inhabit the areas potentially affected by the project. In addition, the extent of habitat modification would be negligible in comparison with the local distribution of the species in western Oregon.

Increased levels of stream sedimentation can cause accumulation of bottom sediments which can impact fish by reducing habitat quality for aquatic invertebrates utilized as food, and by reducing available spawning habitat. Sedimentation can also elevate suspended sediment levels and cause direct injury to fish and aquatic invertebrates (Gibbons and Salo 1973). Sedimentation as a result of this project is not, in general, expected to be significant because of the small increase in sedimentation rates expected (see Water Resources Section in this chapter). In addition, standard road construction practices (discussed previously), which include special measures for problem soils, are expected to minimize sedimentation rates. However, in localized situations, particularly in stream sections within the West Fork Evans Creek drainage, fish habitat impacts may be moderately significant. This drainage contains valuable habitat for coho salmon, summer and winter steelhead, and rainbow and cutthroat trout and has been damaged due to excessive sedimentation and removal of streamside cover as a result of road construction and logging activities in recent years (USDI BLM 1977a, 1979c). Because of the highly erodible granitic soils that occur locally in this drainage, sedimentation rates could be high. In addition, because of the difficulty in revegetating disturbed granitic soils, sedimentation rates might be high for a longer period of time than in other areas (see Water Resources Section). For these reasons impacts may be moderately significant. Highly significant

impacts are not expected because of the small area affected relative to the areas affected by recent logging and road construction in this drainage, and the special construction measures that would be taken.

The use of culverts for some small stream crossings may cause localized impacts to fish habitat due to streambed scouring (Yee and Roelofs 1980). Culverts would be installed in a manner that would not prevent fish passage in any stream sections utilized by salmonids.

ALTERNATIVES

The potential wildlife impacts of the preferred alternative and Alternatives 2 and 3 are generically described above. Table 3-1 quantifies the extent of habitat modification produced under each alternative by land cover type. As identified in the above discussion, moderately significant wildlife impacts may occur because of: (1) habitat loss and human disturbance associated with access road construction in the Ramsey Canyon to Meridian Substation segment; and (2) sedimentation in the West Fork Evans Creek drainage. These impacts would occur for all construction alternatives. Unique aspects of the generic impacts discussed above, as well as other unique wildlife impacts are summarized below for each alternative.

Preferred Alternative

Under the preferred alternative about 16 acres of new right-of-way would be cleared of tall vegetation within the BLM's proposed Spotted Owl Management Area near Canyonville. This limited amount of habitat modification is not expected to reduce the spotted owl population in this area (Lint 1981c). As discussed above, the preferred alternative is not expected to affect the Columbian white-tailed deer. Approximately 10.4 miles of access road would be constructed and 87 acres of forested right-of-way would be cleared in crucial black-tailed deer winter ranges under the preferred alternative. Most of the area affected would occur along the new alignment portion between the Rogue River crossing and Meridian Substation.

Alternative 2

Alternative 2 (parallel alternative) would require the clearing of about 29 acres for right-of-way within the BLM's proposed Spotted Owl Management area near Canyonville. Because this represents less than one percent of the management area it is not expected to significantly affect the spotted owl population in this area. In addition to the potential for construction effects on Columbian white-tailed deer fawning success (see above), Alternative 2 may affect the species habitat. About seven acres of forest, consisting mostly of oak woodlands, would be cleared within the deer concentration area. Because these woodlands represent important habitat to the subspecies and are declining in abundance within this area (Smith 1981a) this

small amount of habitat modification, may have a negative, but insignificant, effect on the population. Alternative 2 would require the construction of about 11.2 miles of access roads and the clearing of 128 acres of forested right-of-way within crucial black-tailed deer winter ranges. Most of the road construction would occur along the new alignment portion between the Rogue River crossing and Meridian Substation. The potential for waterfowl impacts as a resut of collisions with conductors would be higher for Alternative 2 than for the preferred alternative because the new transmission line would be constructed parallel to existing lines which would remain in use, instead of replacing an existing line. However, based on the reasoning presented in the general discussion of waterfowl impacts, collision impacts are not expected to be biologically significant.

Alternative 3

Transmission line development under Alternative 3 (double circuit alternative) would produce wildlife impacts similar to those of the preferred alternative. The potential for waterfowl collision impacts would be higher since double circuit towers are taller than single circuit towers and since conductors are arranged vertically rather than horizontally. Again, however, based on the reasoning presented in the general discussion of waterfowl impacts, collision impacts are not expected to be significant. In the long-term if an additional 500 kV line is needed between Eugene and Medford, the cumulative wildlife impacts of two 500 kV circuits on double circuit towers would be considerably less than if two parallel single circuits were constructed.

OPTIONS

The various options (A through M) would each alter the extent and/or type of wildlife impacts. Table 3-2 quantifies the extent of habitat modification produced under each of these options by land cover type and compares them with the corresponding portion of the preferred alternative. The following discussion compares the impacts of these options in a similar manner.

Options A and C would have lower impacts to forest wildlife in the Eugene area relative to the preferred alternative by reducing the amount of forest clearing and new access road construction, while Option B would have the opposite effect. The differences between Option D and the corresponding portion of the preferred alternative are negligible in terms of wildlife impacts. Options E, F, and G would all lower impacts to forest wildlife between Canyonville and Ramsey Canyon. Impacts to big game mammals and large predatory birds and mammals would be lower because no access roads would be constructed in previously unroaded areas. Option E would also minimize the potential for spotted owl impacts and Option G would also minimize the effects on deer winter range along Evans Creek as well as the potential for sedimentation impacts to Evans Creek.

Option H would have substantially lower impacts to wildlife associated with oak forests, but impacts to coniferous forest wildlife would be higher compared with the preferred alternative. Impacts to crucial deer winter range would be minimized because the two eastern winter ranges crossed by the preferred route would be completely avoided. Impacts due to access road construction in new alignment portions of Option H are not expected to be significant due to the steepness of the area which inhibits human access and the lesser amount of new access road construction relative to the preferred alternative. Also, this area is mostly commercial forest land which, although not heavily roaded at present, is likely to become well-roaded in the near future. Option H is expected to produce a higher potential for waterfowl collisions because greater numbers of waterfowl utilize this section of the Rogue River and the ponds and streams in the White City area along the transmission line. Although a 115 and a 230 kV line presently cross the Rogue River at this location, the conductors and ground wires of a 500 kV line would be higher than the conductors of these lines and therefore would present additional tiers of obstruction to flying birds. However, based on the reasoning provided in the general discussion of waterfowl impacts, the resultant level of mortality is not expected to be biologically significant. Approximately two miles of the Option H route traverses the Kenneth E. Denman Wildlife Management Area owned by the Oregon Department of Fish and Wildlife in the White City area. This management area provides upland game bird and waterfowl habitat. Because waterfowl nesting or rearing habitat would not be affected and less than one-half acre of upland game bird habitat would be occupied by tower sites, impacts to the management area would be insignificant.

Of the six options in the Medford area, Options I and M would minimize habitat disruption in all land cover types, especially oak and coniferous forest, because existing transmission lines would be paralleled or replaced throughout the area. Impacts to big game mammals, large predatory birds and mammals, and wild turkeys would also be reduced because no new access roads would be constructed in previously unroaded areas. In addition, impacts to crucial deer winter range would be minimized because the two eastern winter ranges crossed by the preferred route would be completely avoided. Waterfowl impacts and effects on the Denman Wildlife Management Area as a result of Option I would be similar to those of Option H.

The impacts of Option J would involve more disruption of riparian habitat than overhead conductors during construction. Approximately 2 acres of riparian and wetland vegetation would be cleared during construction at either crossing site, but revegetation of most of this area would occur and long-term terrestrial impacts would be minimal. A potential also exists for suspended sediment and sedimentation impacts in the Rogue River downstream of the crossing during construction. Increased suspended sediment and sedimentation could directly cause higher mortalities of juvenile salmon and trout as well as other species, and decrease the amount and/or quality of spawning and rearing

habitat. Operational impacts are expected to be negligible. An accidental rupture of the cable or oil spill could result in contamination of the river with cable oil. However, this event is expected to be highly unlikely. In addition, available evidence indicates that the cable oils potentially used are low in toxicity (Feng 1971, Azzola 1973).

The impacts associated with Options K, L, and M would be similar to the impacts of the corresponding portion of the preferred alternative, Option H, and Option I, respectively, for the first 10 or 20 years following construction. However, in approximately the late 1990's or early 2000's a second 500 kV line may be built. If this occurs the additional clearing and access road construction identified in Table 1-2 as Potential Future Requirements would occur. Of the three ultimate development options, Option M would minimize wildlife impacts because it minimizes access road construction, especially in previously unroaded areas, and habitat modification.

CULTURAL RESOURCES

A total of three cultural resource sites were identified within the direct impact area of that portion of the project area (Creswell to Ramsey Canyon) subjected to on-the-ground inspection. These include two prehistoric sites in the right-of-way itself, and one architectural complex, the Weaver Farm, outside the right-of-way but partially within the viewshed of the project.

Prehistoric sites 35DO61 and 35DO199 would likely be spanned and thus not impacted by the proposal or any alternative or option. Following the decision on transmission line location and during design, the sites which could not be avoided would be reassessed and all appropriate actions under 36 CFR Part 800 would be accomplished.

The Weaver Farm is located 0.2 mile west of the project corridor, approximately 3 miles northeast of Canyonville. The same process as outlined for the prehistoric sites would be employed.

Within the Eugene routing study area, none of the alternatives or Options A, B, or C would impact any previously recorded cultural resource site. Within the Medford Basin, studies conducted to date have identified over 30 sites within 3 miles of the alternative and option corridors. These sites are recorded on the State Inventory of Historic Places and Jackson County Planning Department resource maps. Sites within 3 miles of the preferred alternative include Dodge Ranch/Hannah Pottery Works (T34S, R1W, S28 and 29), Pacific and Eastern/Medco Railroad right-of-way (T35S, R1E, S18), Brownsboro Cemetery (T36S, R1E, S4), C.C. Charley House (T36S, R1E, S11), Stanley Suspension Bridge (T35S, R1E, S31), Meadows School (T34S, R2W, S21), Derby Station (T36S, R1E, S4), Little Butte Creek Bridge (T36S, R1E, S10), James Williams Barn and House (T35S, R1E, S31), and Antelope

Creek Bridge (T36S, R1E, S19). The remaining sites which include Sams Valley School (T35S, R2W, S29); Van Hovenburg House (T35S, R3W, S25); Sams Valley Grange, Schulz House, Fredenburg House, and Pankey Cemetery (T35S, R2W, S30); Douden-Lyman House and Lyman Mountain Burial Site (T36S, R3W, S1); Sismore-Pelton House (T35S, R3W, S25); Mack House and C.C. McClendon Farm (T35S, R2W, S31); Hutchinson Water Tower (T36S, R3W, S1); Holcom Springs Resort (T35S, R3W, S23); Bybee House/Mission Bell Ranch and Bybee School (T34S, R3W, S26); Lower Table Rock and Wycliff Ranch (T35S, R2W, S9); Sanderson Farm (T35S, R2W, S31); William Payne Cabin (T35S, R1W, S13); Scott Kenyon House (T35S, R3W, S24); Table Rock Bible Church/Table Rock School, Table Rock Treaty Landmark, and Matteson House (T36S, R2W, S10); Pickens and Shelby-Tuttle House (T36S, R2W, S11); and Modoc Orchard Packing House (T36S, R2W, S12) are within 3 miles of one or several of the Medford Basin options. Standard design and construction measures (see Chapter 1 and Appendix A) would preclude disturbance of these sites. Further, most of these sites would fall outside the project viewshed and would not be affected. Others could possibly be within view of the transmission facilities, but these potential site-specific effects cannot be accurately evaluated until more detailed information is available. In all cases, standard practices (see Chapter 1 and Appendix A) would limit impacts.

Following selection of one of the corridors, and prior to initiation of design and construction activities, a detailed cultural resource survey equivalent to that conducted for the Creswell-Ramsey Canyon portion of the project would be conducted for the final project alignment in the Eugene and Medford areas. Should properties be found which are potentially eligible for the National Register, procedures and mitigation measures would be employed in accordance with 36 CFR 800.

Although BLM has attempted to identify all cultural resources within the project's direct impact area, it is recognized that additional archaeological sites might be discovered during construction. For this reason, all areas of surface disturbance in the undertaking would be monitored for previously undiscovered cultural remains. Monitoring would be done by construction crews who would be instructed to stop activities and notify their supervisors if cultural materials are encountered. In addition, the Authorized Officer would be alert for evidence of cultural sites. Should any cultural remains be discovered, work affecting those materials would be halted until compliance with 36 CFR 800.7 is completed. Compliance with these requirements, together with the fact that only a few sites are known to exist in this area, leads to the conclusion that impacts for all alternatives and options would be insignificant. If additional sites are discovered, impacts would be limited to insignificant levels by applicable regulations.

Construction of service and access roads for those portions of the project requiring new corridors would allow access to, and potential vandalism of, archaeological sites which might be in the vicinity of the project area. Such sites would also be subject to vandalism by construction crews. While it is not possible to quantify the extent of such indirect impacts they are not considered to be great since the majority of the project is within or parallel to existing transmission corridors.

RECREATION RESOURCES

Where high-voltage transmission lines would be built across or near recreation resources, several types of adverse impacts would be possible. The construction and operation of the lines could require the removal of existing recreation facilities, such as buildings. Alternatively, the lines could directly interfere with specific recreation activities in the right-of-way, such as model airplane flying. If direct impacts would not occur, the lines could still have an indirect adverse effect on the quality of the recreation experience, usually due to visual impacts.

If any of these impacts occur, their significance can be evaluated in terms of context and intensity. In the analysis summarized here, the context of an impact is defined as the regional importance of a recreation resource or facility, determined by its degree of use, the degree of investment in the resource or the difficulty of its replacement, and the nature of the recreation use in relation to the specific type of impact. The intensity of impact is determined by the extent of recreation resources or facilities that would be removed, the extent of direct interference with recreation activity, and the degree of indirect adverse effect on recreation experience.

The probable recreation impacts of the project alternatives and options are discussed below. These impacts are summarized in the Chapter 1 comparison tables. Certain areas appear subject to several distinct types of recreation impact; this is recognized in the impact tabulations included in Chapter 1. Levels of recreation impacts are defined as high, moderate or insignificant in this table.

PARKS AND RECREATION SITES

None of the project alternatives or options would cross or pass near elements of the National Park System, National Wild and Scenic River System, National Trail System, or any federal Wilderness Areas. Options H, I, L and M pass between Upper and Lower Table Rocks. Both Table Rocks are under consideration by BLM for designation as Areas of Critical Environmental Concern and are already designated as Outstanding Natural Areas by BLM. Impacts on these areas would be indirect, primarily visual.

Alternatives

The preferred alternative and Alternatives 2 and 3 would cause no significant direct impacts on recreation, although they would cross one recreation site, the Ridgeline Trail on the south edge of Eugene. These alternative would be visible from 12 recreation sites or areas, as follows: Spencer Butte; Ridgeline Trail; Mt. Pisgah (Howard Buford Park); Cottage Grove Lake (Shortridge, Pine Meadows, and Wilson Creek recreation sites); Whistler's Bend Park on the North Umpqua River;

North Myrtle Creek Park; Elderberry Flats Recreation Area; Takelma Park on the Rogue River; Agate Lake; and Roxy Ann Peak. Existing transmission structures and rights-of-way are not prominent in views from any of these sites, with the exception of Ridgeline Trail in Eugene (Figure C-1 in Appendix C) and the entrance area at Whistler's Bend Park. The taller steel towers of the proposed 500 kV line would be more visible than existing structures from all these sites, but would not be prominent in most views, so indirect visual impacts on the quality of recreation experience would not be significant, except as specifically discussed below. For more detail on visual effects, refer to the next section of this chapter, which discusses direct impacts on visual resources.

A moderate indirect impact on recreation would occur at the two points where the Twin Oaks-Spencer segment of the preferred route crosses Ridgeline Trail on the south edge of Eugene. Land is being acquired for the development of this park and trail along the ridge of the wooded South Hills. The line does not enter land acquired for park purposes at any point and the existing transmission corridor is not visible for most of the trail's length. However, where the trail joins South Willamette Street and Dillard Road and crosses the existing corridor, there are long views down the transmission right-of-way. The trail appears likely to be used by large numbers of people engaged in passive recreation, who would be sensitive to visual change. Considering the importance of this park and the incremental visual impact of adding a 500 kV double circuit line to the corridor which crosses it, the project would cause a moderate adverse effect on the quality of recreation experience despite the presence of existing lower voltage lines.

A long segment of the existing line is a prominent feature in views when leaving Whistler's Bend Park, where the corridor crosses a small bare hill close to the entrance. The existing corridor reduces the quality of the recreation experience somewhat because it conflicts with the otherwise undeveloped, rural character of this view. Both the preferred and parallel alternatives would be more intrusive than the existing lines, while the taller double-circuit towers of Alternative 3 would have even greater effects on these views and on the quality of the recreation experience. However, impacts within the park itself would be minimal since the line is not visible from most of the park facilities along the river. For this reason, overall indirect recreation impacts on this important park would not be significant for the preferred and parallel alternatives. The more intrusive double circuit alternative would cause a significant indirect impact on recreation at the moderate level of significance.

The preferred alternative and Alternatives 2 and 3 would be visible from the parking lot in the day use area of Elderberry Flats, a BLM day use recreation area and campground located on the West Fork of Evans Creek. The line would not be visible from picnic areas or from campsites because these are set in dense riparian woods. At a future

date, nearby logging could increase the visibility of the line from some locations in the day use areas as well as from other informal recreation areas along the creek. The degree of visibility would depend upon the extent of cutting and whether buffer strips of trees were preserved around the recreation site. Although these details cannot be determined at this point, it is unlikely that the indirect impacts of the alternatives on recreation would be significant at this site.

The route of the preferred alternative and Alternatives 2 and 3 passes several hundred feet north of Takelma Park on the Rogue River south of Shady Cove. The line would have no direct impact on recreation in the park, but would be clearly visible and prominent from the river shore and the grassy meadow north of the boat launch. Despite its lack of facilities, Takelma Park has moderate importance as a recreation feature because of the access it provides to the Rogue River and the high visual quality of the river. The potential degree of impact on the quality of recreation experience is high because of the generally rural character of the area and the proximity of the transmission route.

However, the alignment of the crossing is perpendicular to most views from the park, restricting the number of towers and length of line that could be seen. Accordingly, it appears likely that the visual effects of the preferred alternative would have a moderate indirect impact on recreation at Takelma Park. A parallel alternative is identical to the preferred alternative in this route segment. The double circuit alternative also can be expected to cause a moderate adverse impact on recreation. Figures C-13 through C-16, in Appendix C, illustrate the appearance of these alternatives as well as the degree of visual mitigation that could be obtained through the use of tubular steel towers. Pacific has agreed to establish a screen of vegetation along the banks of the selected Rogue River crossing (see Appendix A). At Takelma Park, trees and shrubs would be planted to help screen views of the line from recreation activity areas, in accordance with a planting plan which would be negotiated with the Jackson County Parks and Recreation Department. By reducing the visibility of the line, this planting would reduce its impact on recreation, although not to a level of insignificance.

Options

Of the various options, H, I, L, and M in the Medford Basin would cross two recreation sites: Medford Sports Park and Hoover Ponds. There would be no significant direct recreation impacts at either site, as discussed below. Indirect impacts on recreation due to adverse visual effects would be possible only at those sites or parks from which the options would be visible. In addition to the sites listed above, these include Upper and Lower Table Rocks, Hoover Ponds, and Medford Sports Park. Indirect visual impacts on recreation are discussed here only for those options assessed as likely to cause significant indirect impacts or assessed as likely to mitigate such impacts that would be caused by the corresponding portion of the preferred alternative.

Option B would not cross the Ridgeline Trail in the Eugene area, thus having no significant impact on recreation sites. Option C (Spencer-Alvey) would also avoid crossing the Ridgeline Trail and would have no significant impact on recreation sites in the South Eugene area.

Option J, an underwater crossing of the Rogue River, would eliminate most of the long-term indirect impacts on recreation at Takelma Park because the only visible elements of the line would be the western terminal structure on the far side of Rogue River Drive and a portion of cleared right-of-way through riparian vegetation on the east side of the river. Construction-period impacts would be moderate, but temporary.

Option K, reserving additional right-of-way along the preferred alternative for ultimate development of a second Eugene-Medford 500 kV line, would have the same effects on recreation at Takelma Park as the preferred alternative until such time as the second line would be built.

Options H, I, L, and M along the existing corridor from Table Rock Switching Station to Meridian would affect four recreation sites that the preferred alternative avoids. The existing route is visible from both Upper and Lower Table Rocks and passes through Hoover Ponds and Medford Sports Park.

Views from the two Table Rocks, both under consideration by BLM as Areas of Critical Environmental Concern, are expansive and cover the entire Medford Basin. A 500 kV line on the north and east slopes of Lower Table Rock would generally not be prominent in views from the top of either rock and would not cause a significant indirect impact on recreation at these sites. However, if a public trail to the top of Lower Table Rock were to be developed across the transmission right-of-way, the line could also reduce the sense of isolation from urban development which appears to be part of this feature's perceived value; it is not likely that this indirect impact would be significant.

Hoover Ponds is a series of man-made retention ponds next to the existing transmission right-of-way and Route 140. No developed recreation facilities exist on this site and the 500 kV facilities would have no impact on current recreation here. While visual impact on future recreation could occur if the ponds were developed for uses such as passive recreation, the ponds appear to have marginal value for such use because of their proximity to the highway and future indirect recreation impacts would be unlikely.

Medford Sports Park, nearby, is also traversed by the existing corridor. This park is used for very active recreation, including drag racing. The recreation experience here focusses on machinery and would not be degraded by the presence of additional transmission lines, nor would the new lines displace any recreation facilities or activities. Therefore, the 500 kV options would have no significant direct or indirect impacts on recreation in this park.

Options H, I, L, and M would avoid all impacts on recreation at Takelma Park.

DISPERSED RECREATION

The effects of the transmission alternatives and options on dispersed recreation would be limited to indirect visual effects on the quality of recreation experience, since no resources for this category of recreation would be displaced. The following discussion deals with effects on dispersed river recreation and trails. Effects on scenic highways are discussed in the next section on visual impacts, to avoid duplication.

Alternatives

The existing transmission corridor, the preferred alternative, and Alternatives 2 and 3 would cross the proposed routes of two Oregon Recreation Trails: the High Divide Trail and the Rogue River Trail, near the north and south boundaries of Douglas County, respectively. The exact location of these crossings would be dependent on final design, both of the proposed transmission line and the trails themselves. The length of time for which future trail users would be exposed to transmission line views would be brief, and careful vegetation clearing and trail and tower siting would keep the impact of these crossings from becoming significant for any of the alternatives.

The quality of dispersed recreation on the North Umpqua River and on the Rogue River would receive moderate indirect impacts from the preferred alternative and Alternatives 2 and 3. These impacts would consist of visual intrusion and removal of riparian vegetation. The existing corridor also crosses the West Fork of Evans Creek in several places. This creek is used for dispersed recreation, such as swimming. The alternatives would reduce the indirect impact compared to the existing line because they would follow a realigned route in this area and would be somewhat less visible from the swimming areas than the line in the existing corridor.

Options

Impacts on dispersed recreation at the existing Rogue River crossing would not be significant for Options H, I, L, and M. The current land use at this location is gravel extraction, which is planned to increase in extent. The existing 230 kV line is supported on steel towers at the river crossing and is similar in appearance to the proposed 500 kV line. Thus, the construction of single circuit or double circuit 500 kV transmission lines at this location would be unlikely to significantly increase the level of indirect impacts on recreation.

Option J, an underwater crossing of the Rogue River, would increase river bank disturbance during construction, but would greatly reduce

the long-term visual intrusion of transmission facilities. Construction of the proposed transmission line with this option would not cause significant long-term direct or indirect impacts on dispersed recreation at either Rogue River crossing.

VISUAL RESOURCES

The visual character of the environments through which the project alternatives and options would pass is quite varied and thus the probable visual impacts are also varied. The context of these impacts in a specific area is determined both by the existing level of scenic quality and by the numbers and characteristics of the viewers exposed to the impacts. The BLM Visual Resource Management designations for the areas that would be crossed by the various route segments have been used to establish the importance of the visual context for these segments.

The intensity of visual impacts can be established by the degree of visual contrast introduced by the proposed transmission line. The major visual components of transmission facilities would be the structures or towers, the conductors and the right-of-way. The degree of contrast which these components introduce would be a function both of the existing visual setting and the viewpoints from which the transmission line would most often be seen.

Extensive field surveys and photography were used to establish viewpoints that are representative of the places from which the transmission route segments would actually be viewed. Many portions of the proposed line would be relatively remote and their visual impacts would likely be experienced only by small numbers of people travelling through or living in the immediate areas.

Photo-simulations have been prepared to illustrate the appearance and assess the visual contrast of the project alternatives and options in areas that are considered to be visually sensitive due to greater numbers of people or to land use for recreation or residential purposes. Though actual tower locations are not yet known, the simulations illustrate the relative scale and character of the 500 kV line and the probable intensity of visual impact, based on the best available information on the location of the line. These simulations are included in Appendix C, with views of existing conditions included for direct comparison.

The probable visual impacts of the project alternatives and options are discussed below. These impacts are summarized in the Chapter 1 comparison tables. Certain areas appear subject to visual impacts on several distinct types of views or viewers; this is recognized in the impact tabulations included in Chapter 1. Levels of visual impacts are identified as high, moderate, or insignificant in these impact summary tables.

In the Twin Oaks-Spencer corridor (illustrated in Figures C-1 and C-2), BPA has an existing 230 kV line in the right-of-way, supported on steel lattice towers, as well as two wood-pole 115 kV lines. The visual complexity of the combination of structures and the straight edges of the corridor clearing contrast strongly with the surrounding wooded hills in the long views available from Dillard Road, Fox Hollow Road, and South Willamette Street. The double circuit 500 kV steel lattice structres to be added here would be much taller than the existing structures in this corridor (see Figure 1-5). The 500 kV structures would extend above the surrounding trees, making the line visible from streets and residences in the adjacent South Hills and Amazon neighborhoods between South Willamette Street and Dillard Road. The moderately high scenic quality of these wooded residential areas and the large number of residential viewers indicate the high sensitivity of the visual context along this segment. The 500 kV line would moderately increase the visual contrast between the corridor and the surrounding visual resources and cause a corresponding decrease in scenic quality. Although the intensity of these effects would be only moderate, the importance of the context indicates that the visual impact would be highly significant, despite the presence of existing lines. Alternatives 2 and 3 would be identical to the preferred alternative at this location.

West of Cottage Grove, all the major transmission alternatives run along the perimeter of a new subdivision. Figures C-3 and C-4 present a view of the preferred alternative from the street in this subdivision, rather than from one of the residences. It is probable that the impact on residential views would be less adverse than illustrated, because these views are oriented downhill and away from the transmission right-of-way. However, some loss of screening vegetation would occur and the line would become more visible and dominant in many views within this subdivision. Nevertheless, careful tower siting and planning of vegetation clearing during final design should prevent incremental visual impacts from becoming significant at this location. Pacific has agreed to this and has also agreed to use nonreflective conductors and tower steel here to hold visual impacts to a low level. Alternatives 2 or 3 would be likely to increase the intensity of visual impacts in this area because they would increase clearing requirements or tower heights, respectively; their probable visual impacts are assessed as moderate.

The photo-simulations at Elkhead (Figures C-5 and C-6) illustrate the visual impact of the preferred alternative on typical views where the line would cross forested but visually accessible terrain. Although the taller 500 kV towers would be clearly visible, the right-of-way clearing would not be increased. Considering both context and intensity, the incremental visual impact of the preferred alternative would not be significant in this and similar areas. This is also probable for Alternative 3. Alternative 2, the parallel alternative, would increase the extent of right-of-way clearing and could have a moderate adverse impact in this area.

Two existing wood pole 230 kV lines and several lower voltage lines parallel the North Umpqua Highway closely for several miles, first on the west and then on the east. The numerous towers are clearly visible on the grassland hills, and the visual complexity which they create detracts from the scenic quality along this heavily travelled recreation route (Figures C-7 through C-10). The scenic quality of this route is good except for this location, and importance of the visual context of the corridor is high. The replacement of one of the exisitng lines with a 500 kV line would increase the adverse visual effects of the corridor. Both the parallel and double circuit alternatives would be more visually intrusive, because the former would retain all existing lines rather than replacing one of these, while the structures for the latter would be considerably taller than single circuit structures. Thus, the intensity of the visual impacts of Alternatives 2 and 3 on this scenic highway would be greater than the preferred alternative. Considering both context and intensity, as well as Pacific's agreeement to use nonreflective conductors and tower steel on this segment, the adverse visual impact of the preferred alternative is assessed as moderate in this location and the impacts of Alternatives 2 and 3 are assessed as highly significant.

The preferred alternative would be visible from Interstate 5 at three locations: south of Cottage Grove (where the existing line crosses the highway), south of Canyonville, and at Azalea. The visual impact in the first location would not be significant because only a small length of the line would be visible through the trees on each side of the road. Because of the distance of the line from the highway at Azalea and the presence of screening vegetation and topography at Canyonville, the line would be a very minor feature in views in these areas and would not introduce significant visual contrast into views from Interstate 5. Alternative 2 would have similar visual impacts at all three locations. The taller double circuit structures of Alternative 3 would increase the probable visual impact at the Cottage Grove crossing to a moderate level.

The views of the existing transmission corridor and the preferred alternative at their crossing of the South Umpqua Valley (Figures C-11 and C-12) illustrate visual impacts typical of the immediate vicinity of the lines where they cross open farmland or grassland. The right-of-way is not visually evident and the additional contrast introduced by the 500 kV structures does not reach the level of significance. Although the contrast added by Alternatives 2 and 3 would be somewhat greater, only the visual impact of Alternative 3 is expected to be significant (at a moderate level), because its taller structures would increase the visually affected area.

In the Medford Basin, the preferred alternative would cause significant visual impacts at Takelma Park near the Rogue River crossing south of Shady Cove. Figures C-13 through C-16 illustrate existing visual conditions and the appearance of the transmission alternatives from Takelma Park. The base photograph is a typical view from the parking

area. The line would also be visible from Rogue River Drive, at the left side of the view. Only a few trees border Rogue River Drive along the field through which the line would pass, just north of Takelma Park. The line would be clearly visible along the road for approximately one-quarter mile, but the duration of these views would be limited by the speed of automobile travel. Persons floating the river would also have a brief view of the line, largely limited to the overhead conductors. Eastward views of the line from the river would be blocked by mature cottonwoods.

In the simulated views, the structures and right-of-way clearing introduce a significant degree of visual contrast. With the use of nonreflective conductors and tower steel, as agreed by Pacific, the intensity of this contrast would be moderate for the preferred alternative and Alternative 2 (identical at this location) and high for the double circuit structures of Alternative 3. Tubular steel structures are also illustrated, and would reduce the contrast associated with the preferred alternative. Pacific agreed to plant trees and shrubs along the banks of the selected Rogue River crossing to help screen views of the line and reduce visual impacts (see Appendix A). At this crossing site, the most effective locations for such planting would be in Takelma Park. A detailed planting plan would be negotiated with the Jackson County Parks and Recreation Department to ensure that the planting would be visually effective and compatible with any future park development plans.

The BLM Visual Resource Management designation for this area is Class 2, reflecting its high existing scenic quality, the number of viewers, and the incidence of recreation activity. This designation indicates the high importance of the visual context in which the transmission facilities would be viewed. Several residences are located on the western hillside above the crossing; the views from these residences are parallel to the transmission alignment and the intensity of impact would be greater than in the public views from Takelma Park. Views down the transmission alignment would also reduce scenic quality from Rogue River Drive. These more general visual impacts at the Rogue River crossing are assessed as highly significant for all the alternatives.

The point at which the preferred alternative would cross the Crater Lake Highway, a designated scenic route, is illustrated from the northbound lane in Figures C-17 and C-18. The alignment would be inconspicuous because it crosses the highway as it dips into a small drainage. The northbound view would be brief and the southbound view would be screened by roadside trees. The visual prominence of the transmission line would also be reduced because Pacific has agreed to use nonreflective conductors and tower steel at this location. Thus, the intensity of the contrast introduced by the transmission line would be low. The visual context is moderate in importance here, although the river cannot be seen, because the roadside development which accompanies the highway throughout much of the Medford Basin thins out

in this location. Few residential views would be affected, although a church is located approximately 1/8 mile south of the highway crossing and would be exposed to open views of the line. Considering both intensity and context, overall visual impact in this area would not be significantly adverse for the preferred alternative and Alternative 2, but would be moderate for Alternative 3. The same levels of impact are likely where these alternatives would cross Route 140 near Brownsboro.

Considering the entire route of the preferred alternative apart from the specific areas discussed above, the differences in visual impacts between the preferred and parallel alternatives are relatively slight because the route would have low visibility overall. Nonetheless, the parallel alternative would be somewhat more intrusive because it would require more right-of-way clearing. Views would also be more complex because no existing lines would be removed. A visual comparison of the preferred alternative with the double circuit alternative suggests that the former would cause less visual impact because it would employ smaller towers. However, if the comparison is made between the double circuit line and the possible ultimate development of two parallel single circuit 500 kV lines, the added impacts of taller double circuit towers would probably be more than offset by the reduction in right-of-way clearing, number of towers, and lower complexity of views toward the lines. Thus, if a second 500 kV line would be needed between Eugene and Medford, Alternative 3 would create less visual impacts than Alternative 2.

OPTIONS

Option A would involve removing the existing 230 kV line in the Lane-Twin Oaks segment of the BPA corridor and replacing it with the 500 kV line, rather than parallel construction. Because Option A would not increase the right-of-way clearing and would result in only one set of structures, it would cause less visual impact along this segment than the preferred alternative. However, the corridor siting is very inconspicuous in this segment and the incremental visual impacts of the 500 kV line would not reach a significant level in either case.

Options B and C would avoid all visual impacts associated with the preferred alternative in South Eugene, at least for the near future. Option B would expose residences in the Spencer Creek area and around McBeth Road to transmission line views. However, these residences are fewer in number than the homes and apartments along the existing corridor, and the dense forest cover in this area would screen the line from most views. Therefore, the adverse visual impacts of Option B would not reach the level of significance. However, the effectiveness of Options B and C as mitigating alternatives to the visual impacts of 500 kV development in the Twin Oaks-Spencer corridor would be entirely lost if it were found necessary to use that corridor for a future 500 kV link between Lane and Alvey substations.

Because of the open, exposed character of the landscape along the North Umpqua Highway it is not possible to eliminate the visibility of the 500 kV line along the existing right of way. Option D is designed to avoid increasing the visual impacts along the highway by routing the 500 kV line down a low-visibility side valley approximately one mile east of the highway and parallel to it. If the Alvey-Dixonville line were then removed, this option would achieve significant visual rehabilitation along the North Umpqua Highway because of the reduction in the visual complexity of the existing corridor. It would then open the possibility of future abandonment and total rehabilitation of this right-of-way.

Further south along the proposed route,between Canyonville and Evans Creek, Options E, F, and G would follow the existing 230 kV alignment rather than the straighter, more direct preferred alternative.

Option E at Canyonville would cause greater visual impact than the corresponding portion of the preferred alternative because it would parallel I-5 closely for several miles and would be visible from this officially designated scenic highway. The 500 kV line would be more prominent than the existing line and would contrast with the steep, forested valley walls which constitute the highway viewshed, although the use of nonreflective conductors and tower steel, as agreed by Pacific, would help to reduce this contrast. The visual impact of Option E is assessed as highly significant, due to the importance of the visual context.

Option F, south of Cow Creek Valley, would be in a location with few paved roads or residences and, like the preferred alternative, would not cause significant visual impacts.

Option G, in the valley of the West Fork of Evans Creek, would differ little in its visual effects from the preferred alternative. In this location, careful tower siting near the road and creek could prevent visual impacts from becoming significant, whichever alignment is chosen.

Option H would follow the Lyman Mountain ridge above the populated portion of Sams Valley to meet an existing corridor to the south. From there it would turn east to Lower Table Rock, where it would meet Line 54 and follow the existing corridor to the Meridian Substation. This option would avoid expansion of the Line 54 corridor through Sams Valley. It would be briefly visible where it would cross Sams Valley Road at the southwest end of the valley and would be visible, but not prominent, across the northern base of Lower Table Rock. If sited on the crest of the Lyman Mountain ridge, Option H would also be very visible from Sams Valley and both Table Rocks. By siting the line to the west of the crest, it should be possible to avoid silhouetting it against the sky except where it crosses the ridge at Lyman Mountain. The exact location of this alignment cannot be determined until geologic investigations have been completed by Pacific at the design stage, although Ferris (1982) has indicated that secure tower sites

could be found off the crest of the hill. This portion of Option H would then have low visual impact, while from Lower Table Rock on, Option H would have the same effects as Option I.

Option I would follow the existing corridor from Ramsey Canyon, through Sams Valley, across the Rogue River, through White City, and on to Meridian. The visual effects of replacing Line 54 with a 500 kV line through the Sams Valley area were identified as a concern during the scoping meetings for the study. Option I would hold the intensity of these impacts to a moderate level by the use of tubular steel structures and nonreflective conductors for the 500 kV line, illustrated in Figures C-19 and C-20. The simplicity and apparent scale of these structures make them more visually appropriate to residential areas than steel lattice structures. Additional right-of-way would be required in Sams Valley and tall trees would need to be cleared, but low-growing vegetation such as shrubs, low-growing oaks, and fruit trees could remain, subject to a case-by-case analysis during final design. The existing route runs on the half-section line through Sams Valley and is generally screened from road views by vegetation. The impact on residential views depends on the orientation of each residence, but most views toward the line appear to be at least partially screened. The visual contrast which would be introduced by the 500 kV line appears moderate to low, but the visual impact of the preferred alternative has been assessed as significant at the moderate level because of the existing quality and sensitivity of the visual context.

South of Sams Valley, Option I would be located on the north and east slopes of Lower Table Rock, where it would cause a moderate adverse impact on views from Table Rock Road and Sams Valley Road. The existing Rogue crossing is inconspicuous due to lack of public access and dense riparian vegetation. Public views of the crossing are limited to the brief views available from the river itself. It is probable that the visual contrast of new 500 kV facilities along the river would not add significantly to the adverse visual effects of the existing crossing and adjacent gravel extraction operation. Similarly, the visual contrast introduced by 500 kV development in the existing corridor would be minimal from the river to Crater Lake Highway because of extensive heavy industry next to the line. Existing commerical strip development at the Crater Lake Highway would also keep the incremental visual impact of the highway crossing from reaching the level of significance.

From Crater Lake Highway east, the existing corridor parallels Route 140. There are large numbers of residential viewers and heavy traffic in this area. However, scenic quality is low here due to the flat terrain, absence of trees, extensive industrial and commercial development, and the existing transmission facilities. The 500 kV line, supported on tubular steel towers in this segment, would not add a significant increment of contrast and the overall visual impact of Option I is assessed as low in this area. The appearances of Options H, I, L, and M are illustrated in Figures C-22 through C-24 in Appendix C.

At the White City Rifle Range (now Medford Sports Park), the existing corridor turns south for several miles to Meridian Tap east of Coker Butte. Options H, I, L and M would follow the existing corridor to that point. There they would turn east and parallel the line on into Meridian Substation. The existing line is visible from the Medford Basin as it crosses the ridge north of Roxy Ann Peak. New transmission lines would require taller structures, but little or no right-of-way clearing on this grassland hillside. The incremental visual impact of these lines would not reach significance.

Option J, an underwater crossing of the Rogue River, could be implemented either for the alternatives along the agency preferred route or for the options along the existing corridor. At the crossing site just north of Takelma Park, Option J would reduce long-term visual impacts to an insignificant level by removing overhead towers, although a cleared right-of-way would still be visible. The terminals necessary for an underground crossing would resemble small substations, but would be sited well back from the river and out of view; tentatively, the eastern terminal could be located east of Crater Lake Highway and the western terminal could be located west of Rogue River Drive. At the crossing site on the existing corridor, Option J would also reduce visual impacts, but these impacts would be low in any case.

Options K, L and M are the Medford Basin ultimate development options that correspond to the alignments of the preferred alternative, Option H, and Option I, respectively. Initially, Option K would involve acquisition of land for two 500 kV single circuit lines but only one would be constructed. The visual impact of Option K would, therefore, be the same as the preferred alternative until such time as a second line would be constructed.

Options L and M would entail construction of a 500kV double circuit line in a "stacked" or "double delta" configuration on existing routes through Sams Valley and the Medford Basin (see Figures 1-20, 1-21, 1-22, and C-21). This would significantly increase the height and the visibility of the structures in comparison to Options H and I. The adverse visual impacts of both options would be moderately significant around Lower Table Rock, while Option M would cause highly significant visual impacts in Sams Valley. However, direct comparisons of the visual impacts of Options L and M with those of Options H and I do not consider that the ultimate development options meet projected needs and requirements for a longer planning period than Options H and I. For this reason they are not strictly comparable, as discussed above for Option K.

LAND USE

A transmission line could impose several types of impacts on land use. First, the location of the line could require the removal of existing structures or could preclude the construction of new structures on

properties the line would cross. Second, transmission lines could interfere with productive use of the right-of-way. Examples include forestry and industrial activities such as log yarding. However, many site uses that would not involve structures can take place within the right-of-way. Examples include parking areas, gardens and orchards. A third type of land use impact is indirect, such as reduction of visual amenity in residential areas. Many of the potential land use impacts of the project alternatives and options that are discussed below fall into this last category.

The context of specific land use impacts can be determined by the economic or social importance of the land use to the community, the level of investment in facilities for the use or the difficulty of relocating the use, and the number of people involved. The intensity of the impact can be assessed by the number or extent of buildings removed (if any), the degree of interference with productive use of specific sites, and the level of indirect effects.

The land use impacts of the project alternatives and options are discussed below. These impacts are summarized in the Chapter 1 comparison tables. Certain areas may be subject to several distinct types of land use impact; this is recognized in the impact tabulations included in Chapter 1.

COMMERCE, INDUSTRY, AND TRANSPORTATION

The route of the major transmission alternatives would not cross any areas used for commercial or industrial purposes and would have no effects on these categories of land use. This route would cross many ground tranportation routes, including railroads and highways; well-established design criteria, which include minimum conductor clearance specifications, will ensure that those crossings do not interfere with surface transportation. Visual effects would be associated with transportation route crossings; these have been discussed in the previous section on visual resources. The preferred route would also pass within several miles of two small general aviation airports in the Medford Basin, but is far enough away from both that it would have no significant effect on air navigation at either airport.

Of the options, those located along the existing corridor in the Medford Basin could involve some impacts on commercial, industrial, or transportation land use.

An aggregate plant is located at the existing Rogue River crossing and has received planning approval for expansion to the north side of the river in the immediate vicinity of the existing transmission easement. Pacific did not comment on the planning application because it believed the operation would not affect the stability of its existing lines, although it also recognized the possibility of locating additional lines at this location (Ferris 1981a).

Options H, I, L and M would all require additional right-of-way across the aggregate mining area. However, the impact on aggregate extraction would be minimal on several counts. No permanent buildings or structures exist or would be built that would have to be removed from the right-of-way. The planned method of operation (using scrapers for excavation rather than a dragline) would be compatible with the transmission easement and almost the entire right-of-way could be mined. The exception would be the tower sites themselves and only one or two towers would be located on the aggregate company's land. While there is a public interest in assuring an adequate supply of aggregate at an economic price, the amount of gravel foregone would have an insignificant effect on this interest.

Option J, the underwater crossing, could also be designed to have a minimal effect on aggregate extraction. For instance, the line could be excavated and placed below the maximum depth of gravel extraction, and the aggregate removed in the process could be stockpiled by Pacific at the owner's direction.

Farther east, at the junction of the Crater Lake Highway and Route 140, there are a number of commercial and light industrial structures near the existing corridor. The corridor also traverses a planned commercial development on the west side of the Crater Lake Highway.

Options H and I would require no additional right-of-way here, so they would have no effect on existing commercial and industrial uses. It is likely that these options would also have no adverse effect on the planned commercial development, since transmission lines can easily be incorporated into the extensive parking lots such developments usually provide.

Options L and M would require additional right-of-way and would probably be located on new right-of-way south of Route 140, as illustrated in Figure C-24 in Appendix C. These options could make some modification of the plans for the commercial development necessary. More significantly, these options could restrict the use of the north portion of the industrial properties along Route 140, or even require the removal of one or more industrial structures. While this possibility cannot be resolved until final design takes place, it warrants a rating of moderate land use impact for these options.

In the White City area, Options H and I would pass within several miles of the Medford Airport. The towers for the 500 kV line would be higher than the existing structures in the established corridor. Nevertheless, they would not be close enough to the airport to constitute a flight obstruction or to require FAA notification. Options L and M would involve taller structures. However, if airport clearances for the Medford Airport prove to be a problem, these structures could be spaced closer together and their bases shortened to obtain required air navigation clearances.

Options H and I also would pass a small private airstrip located northwest of the Table Rock Switching Station. This strip is oriented north-south, parallel to Line 54. Option I would replace Line 54 and therefore would not interfere with current use of the strip. Option H runs east-west in this area, but would not constitute any more of an obstruction than the existing line it would parallel and the distribution line along Sams Valley Road, just south of the airstrip.

RESIDENCES

Numbers of residential dwelling units within 1000 feet of the proposed line or options were estimated from air photo interpretation and field surveys and are listed in Tables 1-4, 1-5, and 1-6. These counts give a general indication of the degree of development along the alternatives and options and of the possible level of public concern over residential land use impacts. However, only a very small proportion of these residences would experience direct physical impacts or visual impacts from the proposed line, most of them being screened by vegetation or topography.

The concentration of residences in the South Eugene area includes approximately 25 percent of the total number of houses and all of the apartment units along the preferred alternative. The majority of these are concentrated within the Eugene Urban Growth Boundary between Twin Oaks and Spencer Switching Station. Because of the concentration of residences, this area of the line is one of the most sensitive in terms of land use. In addition to the existing residences in this area, there are several planned unit developments and other projects planned or under construction within 1000 feet of the line.

Other areas with concentrations of residences include a subdivision at Cottage Grove, Lynx Hollow, Fairoaks, the area south of Dixonville Substation, and Sams Valley and White City along the existing corridor in the Medford Basin. In only two cases are there significant differences in the numbers of residences that would be affected by an option, in comparision to the corresponding section of the preferred alternative. Option B would avoid the concentration of houses and apartments in South Eugene by following a route to the south of the Urban Growth Boundary through an area that is still relatively sparsely populated. The other case is in the Medford Basin, where the preferred alternative would avoid existing population concentrations along Options H, I, L, and M by skirting the Basin to the north and east.

Direct physical impacts on residences appear limited to one location for the alternatives. For all of these, it appears that it would be necessary to remove a single house within the existing right-of-way just south of the North Umpqua River. While serious to the residents involved, the impact on the overall housing stock of Douglas County would not be significant.

Additional direct impacts on residences are limited to Options L and M. These represent the ultimate development options for the Medford Basin which parallel all or part of the existing corridor. South of Medford Sports Park, near the beginning of the Meridian Tap, the two options are identical and would require the acquisition of 262.5 feet of additional right-of-way on the west side of the existing corridor. Three residences, plus at least two houses under construction, are located within this strip of land. While these residences would not need to be removed for the construction of the proposed line, their purchase would be necessary if Options L or M were adopted, in order to reserve space for a second Eugene-Medford 500 kV line. Given the growth pressures in the Medford Basin and the importance that the Jackson County plan gives to maintaining the housing stock, this is assessed as a moderate impact on residential land use. Despite this assessment of general impact on housing, it is recognized that the impact on the persons involved would be high.

A second type of impact on residential land use would be caused by the safety restrictions imposed by transmission easements. Structures could not be built within the easement, so the location of a right-of-way across a lot would restrict the location of a future residence. In areas where the average lot size is less than an acre (approximately 200 feet square), a 175 foot right-of-way split evenly between abutting properties would greatly constrain the future use of the site for residential purposes.

However, the areas where additional right-of-way would be required are generally planned and zoned for minimum residential lot sizes of 2-1/2 to 10 acres. Assuming a square configuration, such lots range in approximate size from 330 feet to 660 feet on a side. Although a transmission right-of-way could interfere with the development of lots that are already platted, and even require replatting in some instances, the restrictions or impacts on residential land use would be much less in areas exhibiting this density than in more urban areas and would generally cause no reduction in the amount of land available for housing development. These restrictions on land use include vegetation management requirements, limits on the placement of outbuildings, and the presence of a tower on every fourth or fifth lot. Site-specific problems due to these impacts cannot be assessed until a route has been selected and detailed right-of-way surveys are carried out.

A third and more widespread type of residential land use impact that would be expected is a decrease in visual amenity for areas exposed to views of the proposed transmission line. Overall visual impacts, considering both context and intensity, have been assessed for the areas along the alternatives and options where concentrations of residences occur. From this perspective, the proposed transmission line would be unobtrusive at most locations. However, in the South Eugene area, the alternatives (all identical in the Twin Oaks-Spencer segment) are assessed as likely to have highly significant indirect (visual) impacts on residential land use. Alternative 2, because of

its wider right-of-way clearing and retention of existing structures, appears likely to cause a moderate degree of indirect (visual) impact at Lynx Hollow, West Cottage Grove and Elkhead. Alternative 3, because of its taller and more prominent double circuit structures, is assessed as causing moderate indirect impacts at Lynx Hollow, West Cottage Grove, and Fairoaks. In the Medford Basin, the alternatives traverse terrain that is sparsely settled at present, but which is undergoing conversion to rural residential use. Because of the restrictions on property use in subdivisions along this route due to the opening of a new corridor, in combination with the indirect impacts on residential amenity, overall land use impacts in the Medford Basin are assessed as significant at the moderate level for all the alternatives.

Of the options, Option B south of Eugene would have moderate impacts on residential land use for the same reasons as the prefered alternative in the Medford Basin. In the Sams Valley area, Option I would cause moderate indirect impacts on residential amenity while Option M would cause highly significant indirect impacts. Options L and M would be likely to cause a moderate degree of incremental visual impact on residences at White City, because they would bracket both sides of Route 140 with transmission lines (see Figure C-24).

These overall assessments are necessarily generalized; indirect amenity impacts at individual residences may be greater or less, depending on specific circumstances of view orientation and the presence of vegetation that would screen views of the lines. In many cases, visual impacts at individual residences in rural areas would be limited by careful tower siting and vegetation clearing. Figures 3-1 and 3-2 illustrate locations along the existing corridor where careful preservation or pruning of trees has preserved a visual buffer between the lines and adjacent houses. Clearing and vegetation management practices like these would be negotiated by Pacific on a case-by-case basis, as long as the integrity of the line would not be jeopardized.

AGRICULTURE

Generic impacts of transmission lines on agriculture include removal of land from production, soil compaction and other surface disturbance, and interference with farming practices. Land occupied by transmission towers and the surface disturbance from construction activity constitute unavoidable impacts, although the latter effects are temporary and both types of impacts are mitigated through compensation or restoration measures. In many respects the greatest long-term impacts are interference with farming activities, including cultivation, planting, irrigation, weed control, chemical application, and harvesting. The need to work around transmission towers creates an efficiency loss through increased operating time. Overlapping operating patterns around towers can also lead to productivity losses through excess application of seed, fertilizer or pesticides and from overworking the soil. Transmission lines create difficulties in the

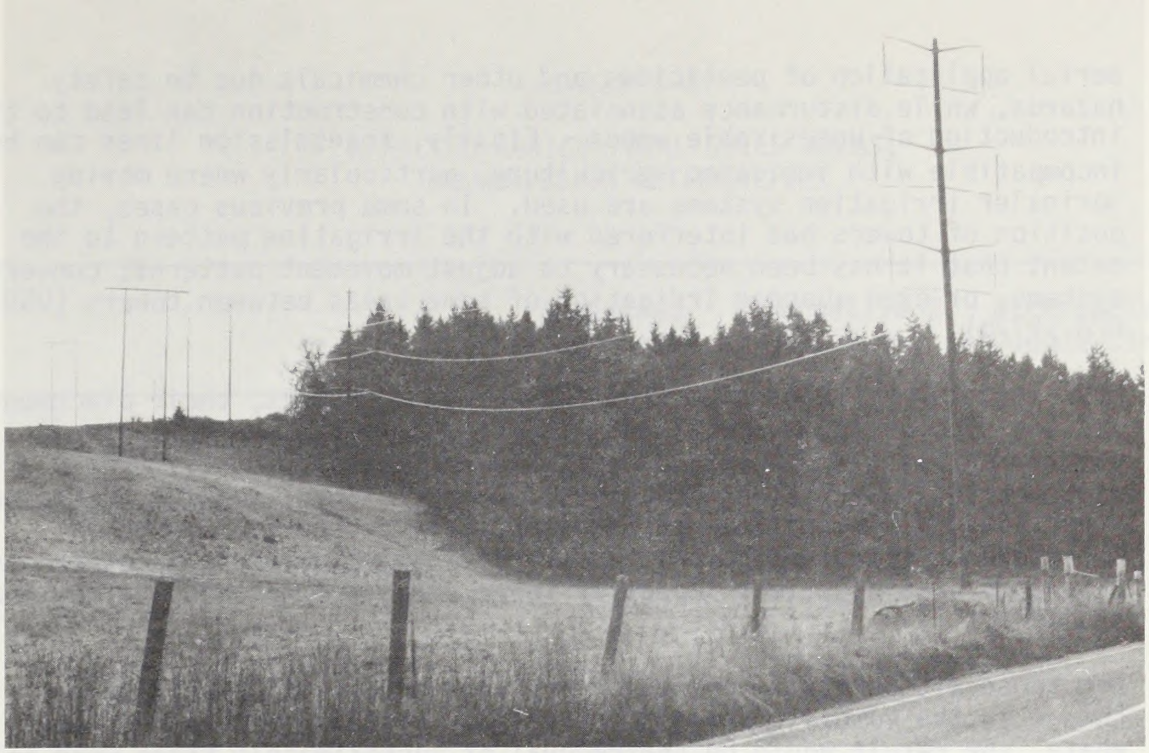


FIGURE 3-1: MAINTENANCE OF VISUAL BUFFER FOR ADJACENT RESIDENCE (HIDDEN IN TREES) BY MINIMUM CLEARING AND SELECTIVE PRUNING (EXISTING CORRIDOR, DRIVER VALLEY, LOOKING SOUTH).

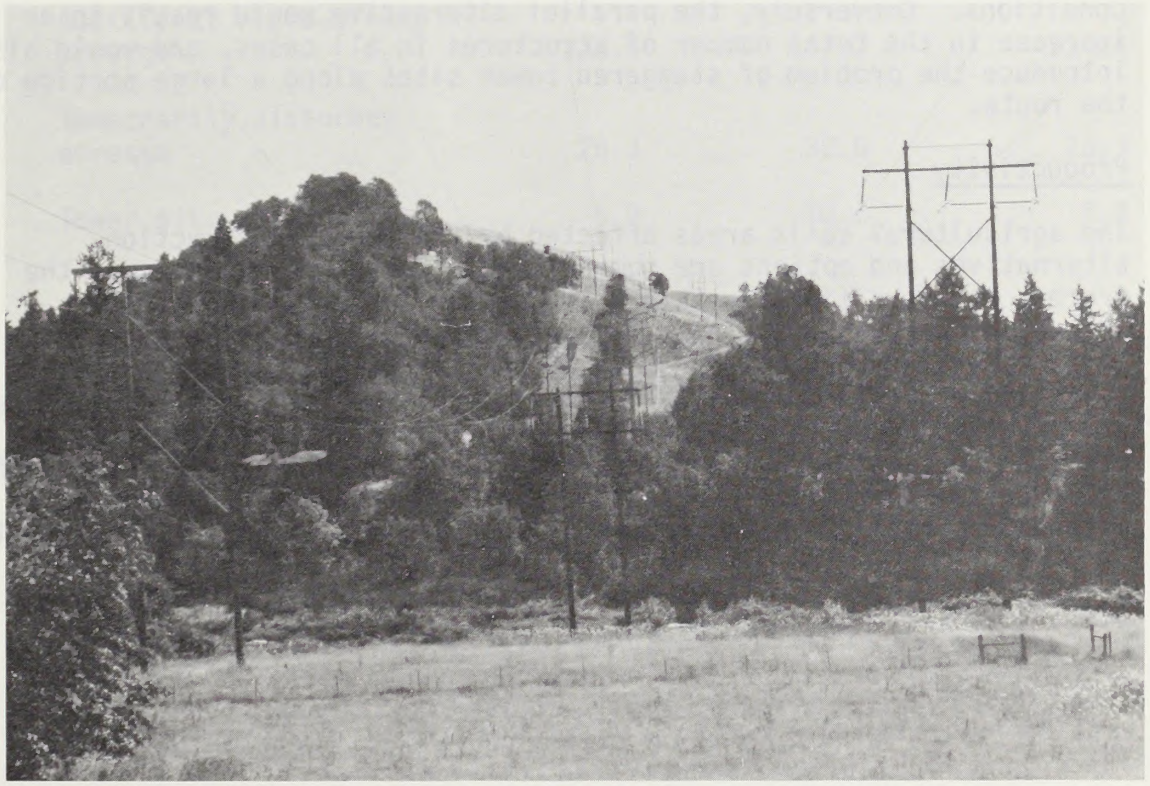


FIGURE 3-2: MAINTENANCE OF VISUAL BUFFER FOR ADJACENT RESIDENCES AND RECREATIONAL USE OF RIVER BY RETENTION OF SHRUBS AND LOW TREES (EXISTING CORRIDOR, NORTH UMPQUA RIVER, LOOKING SOUTH).

aerial application of pesticides and other chemicals due to safety hazards, while disturbance associated with construction can lead to the introduction of undesirable weeds. Finally, transmission lines can be incompatible with irrigated agriculture, particularly where moving sprinkler irrigation systems are used. In some previous cases, the position of towers has interfered with the irrigation pattern to the extent that it has been necessary to adjust movement patterns, convert systems, or even abandon irrigation of some areas between towers (USDI BPA 1977b).

Most long-term effects stem from the number of towers, their placement, and the type of agricultural activities present. Some agricultural parcels can be spanned or avoided, as described previously, while placement of towers along fencerows, property lines, section lines, or other field division lines can substantially reduce the degree of interference with farming practices. Similarly, multiple lines across farmlands will have less impact if tower sites are matched, rather than staggered.

For those alternatives (preferred and double circuit) involving no change in the number of transmission lines present over most of the route, the result would be the removal of approximately three wood pole structures for every two steel towers built in the replacement sections. The advantages to farmers of having fewer structures overall under these configurations would be partially offset in areas where there are existing parallel wood pole lines, but the net result in these areas would probably be little or no worse than current conditions. Conversely, the parallel alternative would result in an increase in the total number of structures in all cases, and would also introduce the problem of staggered tower sites along a large portion of the route.

Productivity

The agricultural soils areas affected by the three construction alternatives and options are summarized in Table 3-4, based upon the process and conditions described in Chapter 2 and the Technical Investigations Report. These figures represent an overstated or worst-case scenario, because some of the land classified as agricultural soil is actually being used for forestry, residential use, and other purposes, although acreages in this condition cannot be precisely determined. The vegetation studies identified 14.8 miles of cropland and 16.5 miles of grazing land along the entire preferred alternative route. This compares to the 51 miles of agricultural soils

TABLE 3-4

AFFECTED AGRICULTURAL SOILS AREAS,
TRANSMISSION ALTERNATIVES

	Preferred Alternative	Alternative 2 Parallel	Alternative 3 Double Circuit
Prime Agricultural Soils			
Route mileage	10.0	10.0	10.0
Additional right-of-way acreage	30.3	170.2	30.3
Temporarily disturbed acreage	5.2	6.5	5.2
Tower site acreage*	1.1	2.0	1.1
All Agricultural Soils			
Route mileage	51.0	51.0	51.0
Additional right-of-way acreage	234.4	847.7	234.4
Temporarily disturbed acreage	26.3	32.9	26.3
Tower site acreage*	5.9	10.1	5.9

* Based on application of standard design factor of 4.3 towers per mile, as if agricultural route mileage were continuous.

shown in Table 3-4. In addition, some of the agricultural land along the route can be avoided through various design adjustments, such as siting towers so that a particular parcel can be spanned.

Impacts shown in Table 3-4 include the additional right-of-way required, the area temporarily disturbed, and tower site acreage in prime and all (including prime) agricultural soils. These quantities were developed using the requirements set forth in Table 1-2 and a standard factor of 4.3 towers per mile, with no regard for the size of a particular tract of agricultural land and the possibility of avoiding it. The minor acreages involved for any of the alternatives (a maximum of 10 acres of agricultural soils occupied by tower bases) indicate that the effects of the proposed project on agricultural land uses might be moderately significant for individual farmers, but would be insignificant in any other context.

Impacts of the options on areas of agricultural soils are summarized in Table 3-5. In the interest of brevity, this table presents the net change for options A-G and J as compared to the section of the preferred alternative each would replace. For the Medford Basin options (H, I, K, L and M) the anticipated effects are presented directly in acres. None of the options would represent more than a marginal change in the area of agricultural soils affected by the preferred alternative, indicating that the agricultural productivity effects of the options would also be insignificant.

Prime Farmlands

It is a Federal policy to avoid impacts to farmlands designated as prime and unique (definitions are based on soil characteristics, land use factors, and potential productivity) by the U.S. Department of Agriculture (42 U.S.C. 4321; 42 F.R. 61072, December 1, 1977). The proposed transmission line would adversely affect prime farmlands in some locations along the route. As shown in Table 3-4, the proposed route for all three construction alternatives crosses approximately 10 miles of lands designated as prime agricultural soils or prime farmlands. Without allowance for spanning or avoiding these areas, it is estimated that a maximum of about five acres of prime farmland would be disturbed by development of the preferred or double-circuit alternative, and 1.1 acre would be permanently removed from production. Corresponding estimates for the parallel alternative were 6.5 acres and 2.0 acres. Tower site acreage is less for the preferred alternative because some sites currently occupied by wood structures could be returned to production.

These figures should be viewed as maximum possible prime farmlands effects based on preliminary estimates. After detailed study of large-scale maps, Pacific engineers determined that most of the prime farmland areas could be avoided, and that only six towers would be required on prime farmlands along the entire route for any alternative

TABLE 3-5
AFFECTED AGRICULTURAL SOILS AREAS, OPTIONS vs. PREFERRED ALTERNATIVE

Option	Route Mileage	Additional[1] Right-of-Way (ac)	Disturbance (ac)	Temporary Tower[2] Sites (ac)
Options A-G, J (net change from preferred alternative)				
Option A, Lane-Twin Oaks Replacement	0	-50.2	-.5	-.7
Option B, Lane-Camas Swale New Corridor	+0.6	+61.7	+8.2	+.4
Option C, Alvey-Spencer	-3.9	-42.5	-1.5	-.6
Option D, North Highway Bypass	-.2	+32.8	+4.5	+.2
Option E, Existing Canyonville Corridor	0	0	0	0
Option F, Existing Green Mt. Corridor	0	0	0	0
Option G, Existing W. Fork Evans Creek-Ramsey Canyon Corridor	-.2	-9.1	-1.5	0
Option J, Rogue River Underwater Crossings				
Preferred Alternative	0	-11.3	+.35	+2.0 *
Existing Corridor (Compared to Option H or I)	0	+5.4	+.29	+2.0 *
Preferred Alternative,				
Option K	5.0	106.0	13.3	1.0
Option H, L	7.3	61.2	61.2	4.5
Option I, M	9.1	50.0	3.2	1.4

[1] Right-of-way acquired for ultimate development options would be roughly double these figures, but only portion shown in table would be affected immediately.
[2] Represents conservative estimate of actual tower base plus surrounding area which could not be cropped.
* Reflects area of terminal stations versus tower sites.

if avoidance of prime farmlands were the sole tower siting objective (Ferris 1981b, 1982). These locations include one tower near Silk Creek west of Cottage Grove, two near the South Umpqua River, two along the east side of the Rogue River, and one in the valley of Little Butte Creek. These six towers would occupy a total of between 0.1 and 0.2 acre. Five of the six tower sites (all but Silk Creek) correspond to floodplain tower sites, which are discussed later. The Silk Creek, South Umpqua and Little Butte Creek sites are currently occupied by improved pasture or hay land, while the two Rogue River sites are currently occupied by riparian woodland. Compared to the total area of prime farmlands in the general vicinity of the proposed route, or in the local areas surrounding the above sites, the effects of any of the alternatives on prime farmlands would be insignificant.

Selection of Option B for the Eugene area would increase the effects on prime farmland, as BPA engineers estimate that 8 to 10 towers would be required on prime farmlands in this new corridor segment (Beraud 1982a). These structures would occupy nearly 0.2 acre, mostly in the Spencer Creek and Camas Swale Creek valleys. Conversely, in the Medford area the options using the existing corridor (Options H, I, L and M) would have less effect on prime farmlands, as these options would require only one tower on prime land at the Rogue River crossing and four along the entire route. Terminal structures for the underground option would not be located on prime farmland, although disturbance along the 50-foot wide cable corridor would affect 2.4 acres on the preferred alternative route and 1.8 acres at the existing Rogue River crossing for one growing season, unless cable repairs required subsequent disturbance. The prime farmland effects of the options, either alone or in conjunction with the alternatives, would be insignificant.

There do not appear to be any practical alternatives to locating some towers on prime farmlands under any combination of alternatives and options under assessment in this EIS. The prime farmland areas which would require towers are located in the bottoms of stream valleys which are essentially perpendicular to the route and are too wide to be spanned. Impacts to prime farmlands could be minimized by following the preferred alternative in the Eugene area and the existing corridor in the Medford area.

FOREST PRODUCTIVITY

Potential long-term impacts to the productivity of commercial forest land resulting from the proposed transmission line and its alternatives are summarized in this section. The figures provided represent a worst-case scenario of lost timber production for several reasons. First, field and aerial photo investigations indicated much of the land along the route which has been classified as commercial forest land has been committed to other uses and is not managed for timber production, although the proportion of forest land in this condition cannot be

easily quantified. This is particularly the case in the northern portion of the route, essentially from Lane Substation to near Cottage Grove, where forest land has been affected by urbanization, subdivision and recreational development. In addition, the calculation of lost timber acreage and volume assumes clearing of the entire right-of-way, which would not be the case. In new corridor sections, for example, it is assumed that on average 125 feet of the 175-foot right-of-way would be cleared; trees left standing on the corridor might not be allowed to reach full economic maturity, but the productive capability of this land will not be entirely foregone immediately upon construction.

The forest impacts resulting from clearing the right-of-way for the preferred route would be partially offset by allowing portions of the existing 100-foot wide Line 54 corridor to revert to former vegetative conditions. If the three realignment sections south of Dixonville were developed for any of the alternatives (i.e., if Options E, F and G were not selected), Line 54 would be removed in the retired Canyonville, Green Mountain and West Fork Evans Creek corridor sections and previously forested areas within these sections would be restored to forest cover as described in Chapter 1. The restored acreage and the wood production volume which it would support must therefore be subtracted from the clearing impacts in order to determine the net forest productivity effects of the alternatives.

Alternatives

The preferred alternative would result in the clearing of 83.2 miles and up to 647 acres of classified commercial forest land. The annual volume which this area is capable of producing is about 56,419 cubic feet, or approximately 293.4 thousand board feet (MBF) at a conservative conversion ratio of 5.2 board feet per cubic foot, the standard Oregon Department of Forestry conversion factor for western Oregon (Joerger 1981). (Stumpage values, wood products employment and other economic factors related to lost timber production are described in the economic section of this chapter.) Class 4 and 5 timber lands, primarily in the Dixonville-Ramsey Canyon portion of the line, account for about 70 percent of the total forest route mileage (58.4 miles) and 87 percent of the timber volume (48,930 cubic feet per year). Class 3 timber lands in the Lane-Spencer and Dixonville-Ramsey Canyon segments account for 4.8 miles and 7,488 cubic feet per year of lost production.

Allowing the Canyonville, Green Mountain and West Fork Evans Creek existing corridor sections to revert to natural vegetation would result in the restoration of forest cover along 15.5 miles of classified commercial forest land. Since the existing corridor is 100 feet wide, this reverted corridor represents an area of approximately 188 acres of forest land, including 16 acres of Class 3 land and 172 acres of Class 4 and 5 land. The production potential of the reverted acreage is estimated at 16,583 cubic feet per year, or 86.2 MBF per year. Subtracting these values from the clearing figures stated previously yields net forest productivity impacts for the preferred and double

circuit alternatives of 459 acres of commercial forest and lost annual production of 39,836 cubic feet or 207.2 MBF. These figures are presented in Table 3-6, along with corresponding data for the parallel alternative.

TABLE 3-6

NET FOREST PRODUCTIVITY IMPACTS
TRANSMISSION ALTERNATIVES

Impact	Preferred Alternative	Alternative 2 Parallel	Alternative 3 Double Circuit
Route Mileage	83.2	83.2	83.2
Cleared Acreage	459.1	1,237.8	459.1
Cubic Feet/Acre/Year, Ave	86.8	100.6	86.8
Cubic Feet/Year Lost	39,836	124,536	39,836
Thousand Board Feet (MBF)/Year Lost	207.2	647.6	207.2

Compared to the net effect of the preferred alternative, the parallel alternative would require more than double the cleared acreage and would increase the annual volume foregone by 213 percent (647.6 MBF vs 207.2 MBF). Aside from the wider right-of-way needed for Alternative 2, a major reason for this difference results from right-of-way clearing in the Camas Swale-Dixonville section, where the route crosses 18.2 miles of Class 3 lands; the preferred alternative does not require any additional right-of-way in this section. Despite the large relative difference in lost production between the alternatives, the absolute level of the forest productivity effects for all alternatives would be insignificant compared to the levels of wood production and timber harvest in the surrounding area.

Options

The forest productivity impact levels of the options differ from the preferred alternative, but these changes are minor as indicated by the figures in Table 3-7. If adopted, none of these options would change the significance level of the forest impacts of the project. The greatest difference from the impacts of the preferred alternative would result from selection of Option B, which would require a new corridor from Twin Oaks to Camas Swale. This new corridor would cross 3.1 miles

of Class 3 land, resulting in an additional .3 miles and 70.5 acres of forest clearing. The additional volume of 9,514 cubic feet lost annually through Option B represents about 24 percent of the total lost production for the preferred alternative. Options H and L in the Medford Basin would also involve greater forestry impacts than the preferred alternative, although these options represent minor volume increases of 1,462 and 3,120 cubic feet, respectively. Options K, L, and M, the ultimate development possibilities for the Medford Basin, have been treated similarly with the preferred alternative and Options H and I because the additional right-of-way acquired would not be cleared for 15 or more years. Clearing impacts roughly equal to those shown in Table 3-7 would occur at that time. The estimated effects associated with each of the Medford Basin options can be calculated from Table 3-7 noting that the preferred alternative would result in 135.1 cleared acres and 8,782 cubic feet per year of lost production (45.7 MBF reduction per year).

Selection of Options E, F or G would also lead to somewhat greater forest productivity impacts for any of the alternatives, due to the effect of restoring the existing corridor on the net impacts of the alternatives. For example, the acreage and volume lost by widening the existing Canyonville corridor by 75 feet for Option E would be 31.9 acres and 2,712 cubic feet per year. These figures are 14.8 acres and 1,258 cubic feet, respectively, greater than the combined effect of clearing a wider, but shorter new corridor while restoring the existing corridor. Option F would involve a net increase of 2,261 cubic feet of lost annual production, as shown in Table 3-7, while selection of Option G would increase the lost production by 1,709 cubic feet per year. The cumulative volume increase which would result from following the existing corridor in all three locations would be 5,228 cubic feet per year, a figure equivalent to about 13 percent of the total volume lost through the preferred alternative.

Options A, C, I and M represent somewhat lower levels of forestry impacts than the preferred alternative, while selection of Option J would not have any net effect on forest land. The reductions in lost timber volume possible through each of these routing options are relatively small, ranging from about 2,700 to 5,600 cubic feet per year. The volume savings from following the existing corridor in the Medford Basin would represent about 14 percent of the total for the preferred alternative.

FLOODPLAINS

The proposed transmission route crosses portions of fourteen 100-year floodplains between Lane and Meridian Substations, as stated in Chapter 2. These floodplain crossings are unavoidable because most of the streams along the route generally flow to the east or west, or perpendicular to the transmission route. Most of these floodplains are

TABLE 3-7

FOREST PRODUCTIVITY IMPACTS,
OPTIONS vs. PREFERRED ALTERNATIVE

Net change From Preferred Alternative

Option	Route Mileage	Cleared Acreage	Cubic Ft/Yr MBF/Yr
Option A, Lane-Twin Oaks Replacement	-1.9	-28.9	-3,362 -17.5
Option B, Lane-Camas-Swale New Corridor	+.3	+70.5	+9,514 +49.5
Option C, Alvey-Spencer	-3.7	24.3	-2,718 -14.1
Option D, North Umpqua Highway Bypass	+.9	+17.2	1,462 +7.6
Option E, Existing Canyonville Corridor	+.9	+14.8	+1,258 +6.5
Option F, Existing Green Mountain Corridor	+1.5	+20.1	+2,261 +11.7
Option G, Existing W. Fork Evans Creek-Ramsey Canyon Corridor	+1.2	+20.1	+1,709 +8.9
Options H and L, Medford Basin West Route	+2.4	+48.0	+3,120 +16.2
Options I and M, Medford Basin Existing Corridor	-3.1	-86.2	-5,603 -29.1
Option J, Rogue River Underwater Crossings	0	0	0 0

relatively narrow and can be crossed by single spans, with no towers actually located within the floodplain. Floodplain tower sites would only be necessary at the South Umpqua and Rogue Rivers, and at Little Butte Creek if the preferred alternative in the Medford area is developed. In compliance with Executive Order 11988 on floodplain management and subsequent U.S. Department of Energy regulations (10 CFR 1022), these floodplain impacts are described in more detail below.

Preferred Alternative

Based upon available engineering information, the preferred alternative would require five towers within 100-year floodplains, including two at the South Umpqua River, two at the Rogue River and one at Little Butte Creek (Ferris 1981b, 1982). These towers would be built on footings which are designed to withstand flooding. Construction of the transmission line would not alter floodplain characteristics or flood mechanics, and would not directly or indirectly support development within the floodplains affected.

The two towers in the South Umpqua floodplain northeast of Canyonville would occupy a total of approximately 1,300 square feet of land, or 0.03 acres; while the precise tower locations have not been established, it is probable that these sites would be on pasture land. Since the proposed 500 kV line would have longer spans than the two existing wood-pole 230 kV lines (Lines 54 and 72), replacing one 230 kV line would reduce the total number of structures in the floodplain from eight to six, as each wood-pole line now has four towers in the floodplain.

The visual impacts of the preferred alternative on the South Umpqua floodplain would be greatest at the point where the corridor crosses the river and Oregon Highway 227, which runs along the south bank of the river. The existing lines span the river and highway from structures on the wooded bluff north of the river, with the next set of structures located in pasture approximately 100 to 150 yards south of the highway. The lines continue in a southerly direction through more pasture land for approximately one-half mile before reaching the toe of the south valley wall. The steel 500 kV towers would be larger and more noticeable than the existing wood structures, but the northernmost floodplain tower would be further away from the South Umpqua River and Highway 227 due to the longer 500 kV spans. Vegetation clearing in and near the floodplain would be minimal for the preferred alternative, due to the height of the line at the river crossing and the openness of the valley. Visual impacts on the South Umpqua floodplain would otherwise be as described in the visual resources section of this chapter.

Due to existing conditions in the South Umpqua Valley, the primary concerns in this area are described above. This stretch of the river valley was identified in Chapter 2 and the Technical Investigations Report as a waterfowl nesting and rearing area, but the population using the area is small and the expected level of impact minor, as

described in the wildlife section of this chapter. The South Umpqua River is valued habitat for anadromous salmonids and other fish species, but construction activities for the preferred alternative would be some distance away from the river and should not affect local fisheries.

There are no practical alternatives to the proposed floodplain crossing which would substantially reduce floodplain impacts. The South Umpqua river must be crossed, as it runs perpendicular to the route of the preferred alternative. Agricultural activities extend up the valley for several miles eastward from the existing crossing and could not be avoided, while agricultural and residential intensity is greater west of the crossing toward Canyonville.

In the Medford area, the preferred alternative would require two towers in the Rogue River floodplain (Ferris 1981b, 1982), occupying 0.03 acres of what is now a riparian woodland of 100 to 150 acres. The floodplain is approximately 3,200 feet wide at this point, requiring between 5 and 7 acres of the riparian vegetation to be cleared. This riparian habitat is used by a wide variety of wildlife species, but cannot be considered a unique resource. Similar riparian woodland areas are present elsewhere along the Rogue River, including a relatively large area around Kelly Slough immediately downstream of the existing crossing.

The Rogue River crossing on the preferred alternative would be visible from Rogue River Drive along the west bank, Takelma Park, the river itself, and from some residences in the area. Descriptions and simulations of these visual effects are provided in the visual resources discussion. The visual impact associated with the introduction of transmission towers and lines and right-of-way clearing in this rural area would be significant.

Practical alternatives to the proposed floodplain crossing are limited. The Rogue River must be crossed at some point in order to reach Meridian Substation. Aside from the existing corridor crossing, which is described subsequently, potential crossings are highly constrained by development throughout the Medford Basin and along the Rogue River. The preferred alternative crossing location was selected primarily because it is in a relatively less developed area between Shady Cove and the bulk of the Medford Basin settlement. Additionally, this route was designed to remain in the hills around the edge of the basin, while the Rogue River Valley enters the much wider basin just south of the proposed crossing. The Rogue floodplain narrows to about 900 feet within two miles of the proposed crossing, but residences and farms along or near the river virtually preclude crossing at any other point in this area. South of Dodge Bridge (Route 234) the floodplain ranges from 3,000 to 4,000 feet wide above Little Butte Creek and over 4,000 feet below it, and a crossing in this part of the basin would also require many more miles of new corridor through developed areas.

The third floodplain crossing for the preferred alternative would be at Little Butte Creek, east of Brownsboro. One tower would be located in agricultural land at this point, occupying approximately 0.015 acres. Vegetation clearing would be minimal because the valley in this area is predominantly open. The route crossing Little Butte Creek passes through deer winter range which extends for more than 10 miles southeastward up the valley; the effect of the preferred alternative on this range is not significant, as described in the wildlife section.

The 500 kV line crossing Little Butte Creek would be visible from Highway 140 and from a few residences in the valley, depending upon the presence of screening vegetation. The valley is narrow enough at this point that the crossing could be accomplished by a single span, with no tower on the valley floor, but this would require towers in prominent view on the slopes on either edge of the valley (Ferris 1982). Siting one tower in the floodplain would allow the two adjacent towers to be set back some distance from the floodplain and highway, reducing overall visual impacts at this point. Spanning the Little Butte Creek Valley is the only practical alternative to this crossing if this route is selected; the valley is more intensively developed to the west of the crossing, while agricultural and residential land uses extend eastward up the valley for several miles.

The effects of the preferred alternative upon floodplains themselves, in terms of hydraulics or development on the floodplains, would be insignificant. Effects on floodplain resources and their significance are described elsewhere in this EIS; with the exception of visual effects at the Rogue River crossing, these floodplain-related effects are also insignificant.

Alternatives

The floodplain impacts of the parallel and double circuit alternatives would be largely the same as the impacts described above for the preferred alternative. Two towers would be located in the South Umpqua River floodplain in each case, while the substantive differences among alternatives would primarily relate to appearance. The parallel alternative would result in a total of three lines crossing the floodplain, rather than two, while the double circuit alternative would involve larger, more noticeable towers than the preferred alternative. Since the three alternatives follow the same basic configuration below Ramsey Canyon, there would be no significant differences in floodplain impacts at the Rogue River and Little Butte Creek. The no action alternative would avoid these impacts.

Options

Options H through M would involve considerable variation in floodplain effects within the Medford Basin. Options H, I, L and M pertain to the existing crossing of the Rogue River near Lower Table Rock, Option K would affect the floodplain areas along the preferred alternative, and

Option J could apply to either Rogue River crossing. The effects of Option K, the preferred alternative ultimate development, would be the same as for the preferred alternative until some future point when a second line would be needed. Additional right-of-way through the Rogue and Little Butte Creek floodplains would be acquired initially, but this would not result in any additional visible impacts. If and when the second line is constructed, the number of floodplain tower sites (3) and area of clearing (7-9 acres) would be approximately the same as for the initial line unless transmission construction practices change.

Development of any of the four existing corridor options (H, I, L or M) would require three towers to be located in the 3,800-foot wide floodplain at the existing Rogue River crossing (Ferris 1981b, 1982). These towers would occupy less than 0.1 acre of cropland and riparian habitat north of the main channel of the river. The riparian area at this crossing is not heavily wooded, so clearing would be much less extensive than for the preferred alternative. Options H and I would require 125 feet of clearing through the wooded area, compared to the 137.5-foot right-of-way of the ultimate development options (L and M).

The visual impacts which would be associated with these options are described in the visual resoures section. This crossing would not be highly visible due to its distance from public roads, although the double circuit towers of Options L and M would be more visible than in the other cases. Additionally, the 500 kV crossing would be adjacent to a 230 kV line and near a gravel pit, reducing the incremental visual impact. Overall, the primary concern would appear to be related to wildlife, particularly the potential for waterfowl collisions; this is discussed in the wildlife section of this chapter. Alternative crossing points in the vicinity of the existing crossing are highly constrained by the Kelly Slough area to the west and irrigated agricultural lands to the east.

Development of Option J represents a trade-off between temporary and long-term impacts and between visual impacts and other potential resource impacts. Actual ground disturbance resulting from equipment movement and trenching would be slightly less than 4 acres within the Rogue River floodplain at the preferred alternative crossing and nearly 4.5 acres at the existing crossing. Depending upon centerline placement, wooded areas requiring clearing would probably comprise approximately half of the preferred alternative crossing and 10 to 20 percent of the existing crossing. While surface disturbance (other than clearing) would be greater for an underground crossing, selection of Option J would eliminate the need for structures within the floodplain and thereby substantially reduce long-term visual impacts or hazards to waterfowl.

ECONOMIC CONDITIONS

The proposed transmission line project would have direct and indirect effects upon economic conditions in the project area. Direct effects

would consist of potential changes in the use, productivity, and value of the land occupied by or adjacent to the line. Indirect effects meriting attention in this document consist of local economic impacts associated with construction workers and expenditures, and effects of the project on Pacific's rate payers. While these impacts may be perceived as substantial by some local residents, particularly individual landowners along the transmission route, it is evident from the following discussion that the project will have minor economic impacts on agriculture, forestry, local tax bases, employment, and income. The no action alternative would avoid the minor adverse effects on agriculture and forestry, but would lead to the possibility of other, more widespread negative consequences.

AGRICULTURE

The extent to which physical effects on agriculture translate into economic impacts is difficult to quantify. The proposed line's interference with farming practices would ultimately enter into the economic returns of the individual farmers affected, but these effects would vary along the route with type and volume of production, method of irrigation (if present), the size of fields and of equipment used, and other factors. In order to provide estimates of the range of possible economic effects on agriculture, some broad assumptions have been made concerning these factors.

The vegetation/land cover classification effort identified 14.8 miles of agricultural land along the entire route of 146.8 miles. (This figure is a much more accurate reflection of current conditions than the potential soil productivity data cited earlier; most of the land classified as agricultural by soil type is simply not under cultivation at present.) The total right-of-way area on agricultural land would be 314 acres (21.2 acres/mile) for all three alternatives. Using the standard factor of 4.3 towers per mile, a maximum of 64 towers would be located on farmlands under any of the construction alternatives. Strictly for purposes of providing a uniform standard upon which to measure potential impacts, it will be assumed that all of the farmland along the route is and will be used for the production of alfalfa hay. Some farmland along the route above Ramsey Canyon is actually used to produce grass seed or orchard or row crops, while most is used for pasture and grass hay. Although much of the Medford Basin is intensively farmed and irrigated, agricultural land along the routes of the alternatives and options is almost exclusively pasture and hay land. An average yield of 4 tons of hay per acre per year will also be assumed, a very conservative figure in view of the overall 1978 Oregon yield of 2.52 tons per acre (U.S. Department of Commerce, Bureau of the Census 1980). The annual production on 225 acres would be 900 tons of hay.

A reasonable estimate of the potential agricultural losses would be based upon the number of towers located on farmland. Given the typical tower base area of approximately 0.015 acre, a larger area of 0.1 acre per tower could be considered a very conservative or pessimistic estimate of the area of lost production. This figure does not explicitly capture such problems as lost operating time, but overstates the uncultivated area around tower bases and the effect of overlapping operating patterns. The total acreage lost at 64 agricultural tower sites would be 6.4 acres. With a yield of 4 tons of hay per year and a price of $100 per ton, the corresponding volume and value levels for this area would be 25.6 tons of hay per year at a value of $2,560.

One year's production would be lost on lands disturbed during construction. At 0.5 acre per mile disturbed, this one-time production loss for 14.8 miles of agricultural land would be 29.6 tons or $2,960.

The aggregate gross production losses which would occur from development of any of the alternatives would probably be close to the latter estimate, although this would not reflect net value after subtraction of production costs. Because most of the farmlands crossed by the route are in the bottoms of valleys which are perpendicular to the route, the longest continuous farmland section under the proposed line would likely be about 0.6 miles. If this were all under one ownership, the maximum possible loss in annual income for any individual farmer would be 0.3 acre and $120. Farmers would presumably identify and be compensated for their losses as a result of their easement negotiations with Pacific. While some individual farmers would be likely to feel that they were significantly affected by the proposed line, the minor volume and value of lost production indicates that agricultural effects of all alternatives and options would be insignificant.

FORESTRY

Construction of the 500 kV transmission line would create a variety of forest-related economic impacts concerning timber harvest volumes and values; logging and wood products employment and income; indirect jobs and income dependent upon timber harvesting and processing; and yield taxes or other forms of public revenues derived from timber harvest. The estimated effects of the project on these variables are presented below and are summarized in the discussion which follows, and supporting information is included in the Technical Investigations Report and the land use section of this EIS.

Forest clearing and right-of-way acquisition associated with the preferred alternative would result in a maximum aggregate annual loss of 39.8 thousand cubic feet (MCF) or 207.2 thousand board feet (MBF) of timber (as shown in Table 3-8), assuming the productive capacity of the entire right-of-way and off-corridor access road areas is foregone. These figures incorporate the offsetting effect of allowing the

existing Canyonville, Green Mountain and West Fork Evans Creek corridor sections to revert to timber production. Right-of-way clearing could produce a minor short-term increase in the local timber harvest from private lands; total BLM timber harvest would remain as programmed. If the average standing volume on the proposed right-of-way is conservatively estimated at 20 MBF per acre (the 1978 average for BLM's Jackson Sustained Yield Unit was about 14.4 MBF/acre; USDI BLM 1979c), clearing all 647 acres of new right-of-way would yield about 12.9 million board feet (MMBF). Clearing for the parallel alternative would yield about 28.5 MMBF under the same factors. In comparison, the annual timber harvest in Douglas County alone has consistently exceeded 1,500 MMBF in recent years (Douglas County Planning Department 1979).

TABLE 3-8

COMPARISON OF TIMBER-RELATED ECONOMIC IMPACTS

Long-Term Losses	Alternative		
	Preferred Alternative	Alternative 2 Parallel	Alternative 3 Double Circuit
1. MBF/Yr	207.2	647.6	207.2
2. Annual timber value	$46,620	$145,710	$46,620
3. Annual yield tax	$2,273	$7,103	$2,273
4. Annual O and C payments	$5,827	$18,214	$5,827
5. Timber employment	1.26	3.95	1.26
6. Timber earnings/yr	$25,704	$80,580	$25,704
7. Total jobs	2.33	7.31	2.33
8. Total earnings/yr	$43,697	$136,986	$43,697

The value of the timber cleared from the right-of-way for the preferred alternative would be about $2.9 million, assuming an average stumpage value of $225 per MBF. This yield would partially offset the economic loss of future timber values, even under conditions of rising real timber prices, due to the effects of discounting on future income. Timber sales from right-of-way clearing would also provide some immediate revenues to local governments in the project area. Approximately 75 percent of the timber along the proposed route is

privately owned, with the remainder on BLM lands. The State of Oregon yield tax of 6.5 percent on private timber would therefore provide over $140,000 of tax revenues, to be redistributed locally according to formula. Applying the O and C payment rate (the major item in BLM's payments to state and local governments) of 50 percent to the remainder would yield approximately $360,000, to be distributed to the O and C counties of western Oregon. The O and C payment figure would not represent a net increase, however, as the right-of-way volume would have to be offset by a like reduction elsewhere on BLM lands in order to remain at the programmed harvest level.

The annual timber volume foregone due to the project would have a value of about $46,600 for the entire route. The annual tax revenues from 207.2 MBF of harvested timber, with the 75/25 percent ownership distribution, would be about $2,300 of state yield taxes and $5,800 of O and C payments. Using a basic discount rate of 10 percent, and allowing for a two percent annual escalation in stumpage values, the maximum potential timber growth within the corridor over a 40-year project life would have a present worth of roughly $550,000.
A minor long-term reduction in forest-related jobs and income could be attributed to the lost timber production associated with the project. Although project right-of-way clearing can be assumed to represent a small one-time increase in local private timber harvest, the project cannot be credited with creating a short-term increase in timber-based employment. Conversely, the annual timber volume which could be produced on the right-of-way would support a given level of employment in logging and wood processing, jobs and income which would in turn support additional indirect economic activity in the local community.

The estimates in Table 3-8 of timber-based employment and income lost as a result of the project are based upon research on employment/wood consumption relationships conducted by U.S. Forest Service economist Brian Wall for BLM (USDI BLM 1978d, 1979c). Estimates for 1980 and 1990 of employment in logging, sawmills, and veneer and plywood mills per million board feet of timber harvested and processed within the Medford timbershed were as follows:

County	1980	1990
Douglas	6.44	5.81
Jackson	6.98	6.12
Josephine	5.49	4.86
Klamath	5.65	5.00

Given these ratios, the distribution of the affected forest lands, and the planned 1985-88 construction period, a composite figure of 6.1 jobs per million board feet was determined to be appropriate as an average factor for all project alternatives. Accordingly, the annual loss of 207.2 MBF of timber through the preferred alternative would technically result in an expected reduction of 1.26 timber-based jobs in the entire study area (see Table 3-8). Based upon an estimated composite annual

income of about $20,400 (in 1981 dollars) among lumber and wood products workers in the region (USDI BLM 1979c), the annual direct income associated with this employment level would be $25,704.

Composite employment and income multipliers were selected in a similar fashion, based on individual county multipliers developed for the Jackson-Klamath Timber Management EIS (USDI BLM 1979c), in order to estimate the indirect economic effects of the reduced timber harvest. An average employment multiplier of 1.85 was used for this calculation, resulting in a total direct and indirect loss attributable to the project of 2.33 jobs and $43,697 of income.

The differences in the timber-based economic impacts of the proposed line and the two alternatives are presented in Table 3-8. The timber-related impacts of the parallel alternative would be greater than for the preferred or double circuit alternative, although still minor on a regional or community basis. The annual value of lost timber production for Alternative 2 would be over $145,700, compared to about $46,600 for the preferred alternative. The present value of the annual losses for the parallel alternative over a 40-year project life would be about $1.7 million. The maximum total (direct and indirect) employment and income loss would be 7.31 jobs and about $137,000 under Alternative 2. Changes in these impact levels resulting from any of the options would be very minor, particularly in regard to jobs and income. The largest change would result from Option B, the new corridor from Twin Oaks to Camas Swale, which would result in an additional potential value loss of about $11,100 per year. Compared to existing harvest values and timber-based employment and income levels in the surrounding area, the effects of the project alternatives and options would be insignificant.

PROPERTY VALUES AND TAX BASE

The proposed transmission line may arguably have a minor effect on property values in and adjacent to the corridor, and therefore upon local tax bases, although the overall effect to local tax bases would be positive due to the value of the line. Property owners whose land is required for the transmission line right-of-way realize direct initial property value effects, but also are directly compensated for their losses. Whether the constructing utility purchases an easement or the land in "fee simple" it must be assumed that through the process of negotiation or court settlement the landowner generally receives fair compensation for the loss or restriction of use of the property.

The purchase of land or an easement for a transmission right-of-way severely limits the use of the land, or removes it from production as in the case of cleared forest land. This impairment of use or productivity theoretically reduces the value of the land, which should be reflected in subsequent property tax assessments. According to the Bonneville Power Administration (1977b), however, county tax assessors

have rarely responded to right-of-way easement acquisition by reducing the assessed value of the property in question. Any possible reduction in assessed right-of-way land values would be heavily outweighed by the assessed value of the taxable portion of the transmission line itself.

A related issue is the effect of a transmission line on properties which are close to but not within the right-of-way. In past cases, and at previous public meetings related to the proposed Eugene-Medford line, owners of adjacent or nearby land have voiced the opinion that the value of such properties was reduced without compensation. Research on the subject is inconclusive, but tends to support the belief that off-corridor lands are not significantly or consistently diminished in value. Mountain West Research, Inc. (1981a) recently completed a review of the literature on property value effects of transmission lines, finding that 5 of 27 studies reviewed concluded that there was an adverse effect, 5 concluded no effect, 7 concluded no significant adverse effect, and 10 were inconclusive or internally contradictory.

Contrary to the indications of the land value research are the results of a 1981 court decision concerning a 500 kV BPA powerline in Wasco County, Oregon, in which a federal district court judge found significant value damage to property which was not within the right-of-way. In the condemnation case of U.S. v. Abbott (U.S. District Court, Oregon District, Civil No. 79-403, 1981), the court awarded damages to the landowner equal to 12 percent of the fair market value of the entire off-corridor portion of the property. The court valued the property in question on the basis of its development potential for recreational homesites, rather than according to its current use as agricultural and range land. In view of this conflicting evidence it is impossible to predict the real or perceived land value effects of the proposed transmission line. However, it is certain that some landowners near the corridor would feel that the value of their land has been diminished, particularly in those rural portions of the route which hold some potential for recreational or residential development.

Pacific's portion of the transmission line would provide a minor increase in the property tax bases and revenues of Lane, Douglas and Jackson Counties. BPA does not pay property taxes, so its portion of the line would not increase the tax base of Lane County. Private utility property in Oregon is centrally assessed by the Oregon Department of Revenue. Utility assessment is essentially a three-step process in which transmission lines are included with distribution facilities in the rural wire plant value, which is a residual value left after generating plant and "situs" properties (such as substations) are valued and apportioned separately (Arrowsmith 1982). The wire plant residual value, which is not a true value of all transmission and distribution facilities, is then apportioned to taxing districts through a mechanical formula based on wire miles.

In some cases the Revenue Department has assessed a specific transmission line on a "situs" basis if the actual cost of the line is known, although all transmission lines eventually are incorporated into the wire plant residual. While the cost of the Eugene-Medford 500 kV line would be known, the value of the line would probably be melded into the residual because there are so many existing transmission lines in the area (Arrowsmith 1982). The construction period would provide a limited exception to this treatment, as construction work in progress is assessed on a situs basis.

Because transmission lines have assigned values rather than appraised values, the actual assessed value of the new line cannot be estimated on the basis of its cost. Instead, the tax base and revenue effect of the line must be estimated on the basis of typical values, which generally range from $10,000 to $20,000 per wire mile. Since each of the proposed line's three phases would consist of a three-conductor bundle, each route mile of the 500 kV line would equal nine wire miles for tax assessment purposes. The eventual tax base effect would therefore range from $90,000 to $180,000 per mile of line, with no distinction between alternatives (assuming only one circuit is strung initially for the double circuit alternative) due to the nature of the assessment system.

Approximate data on route mileage and tax base effects in each county are provided in Table 3-9, with the value data based on a mid-range wire-mile figure of $15,000. Using these valuation factors, the proposed transmission line would increase the assessed valuation of Lane County by about $4 million, Jackson County by nearly $5.7 million, and Douglas County by about $8.9 million. The relative impact of these increases would be insignificant, as the line value would amount to less than one-quarter of one percent of the estimated 1981 total assessed valuation in each county; the lowest assessed valuation was an estimated $2.6 billion in Douglas County. Assuming an average combined levy rate of $15 per $1,000 of assessed valuation, the proposed line would generate a total of nearly $280,000 of tax revenues annually. If this tax rate existed in all three counties (an unlikely occurrence), county receipts would range from about $60,000 in Lane County to over $130,000 in Douglas County. These figures would be insignificant compared to the operating budget levels or total government receipts in the respective counties. Property tax receipts to the counties would be considerably higher during the construction period, particularly if the double circuit alternative were selected.

CONSTRUCTION LABOR FORCE AND EXPENDITURES

The maximum construction force for the Pacific portion of the project would number approximately 200 workers, to which would be added a supervisory and inspection work force of 25 (Pacific 1981a). With the exception of tower assembly, erection and stringing crews, workers for

TABLE 3-9

TAX BASE EFFECTS

County	Route Miles	Wire Miles	Line Value (Thousands)	Line Value as Percent of Total Assessed Value[1/]
Lane [2/]	30	270	$ 4,050	0.03
Douglas	66	594	$ 8,910	0.24
Jackson	42	378	$ 5,670	0.12
Total	138	1,242	$18,630	--

[1/] See Technical Investigations Report, Table 7-11, for estimates of 1981 total assessed valuation in each county.

[2/] Portion of line in Lane County to be built by Pacific; over nine miles of line would be tax-exempt BPA property.

the clearing, foundation, pad construction, and similar operations would be hired locally. It should be possible to hire 60 to 70 percent of the construction workers from the local labor force under normal labor conditions (Pacific 1981a), thereby reducing the possibility of noticeable socioeconomic impacts from an influx of workers. The percentage of local hires would be much less if local labor is in short supply, perhaps in the range of 25 to 35 percent.

Socioeconomic effects associated with the construction labor force would be further diffused by the scheduling and staging of construction work elements. The Pacific portion of the line would be constructed in segments by crews operating out of major staging areas, which would probably be located at Cottage Grove and Grants Pass (the base location is usually determined by negotiation between the contractor and the workforce; Pacific 1981a). Personnel working out of these bases would be clustered in smaller groups according to individual operations in the construction process. Therefore, several crews based near Cottage Grove would be distributed along the length of the Spencer-Dixonville segment during the 1985 construction season, and several crews based near Grants Pass would be distributed along the Dixonville-Meridian segment during the 1987 and 1988 construction seasons.

The local share of the transmission line construction jobs would be filled from a multi-county labor pool. For the first phase, from Spencer to Dixonville, this labor pool would essentially consist of construction workers in Lane and Douglas Counties. Combined construction employment in these two counties during 1978 averaged 6,879 workers, including 1,298 workers with heavy construction contractors (see Technical Investigations Report, Sec. 7.2). The second phase of the project would generally draw workers from Douglas, Josephine, and Jackson Counties, which together had 4,125 construction employees and 902 heavy construction workers in 1978. The local labor demand of 120 to 140 workers would be equivalent to about 2 percent of the 1978 total construction labor pool and 10 percent of the heavy construction pool for the Spencer-Dixonville phase of the project; corresponding figures for the Dixonville-Meridian phase would be about 3 percent and 14 percent. Since each local labor pool is likely to be larger in 1985 than in 1978, and most or all clearing work is likely to go to local logging contractors, the local labor demands of the project would not be likely to strain the available labor supply.

The non-local component of the construction labor force, which is expected to consist of 85 to 105 construction workers, supervisors and inspectors, can be considered a very minor temporary increase in the local economic base. The greatest relative effect would be in Josephine County, given a projected staging area at Grants Pass; the maximum nonlocal workforce of 105 persons would be equal to approximately 0.4 percent of the non-agricultural wage and salary employment level in Josephine County for 1980 (Technical Investigations Report, Sec. 7.2). The non-local workers are unlikely to bring many dependents with them due to the staging pattern and short duration of the project, so the temporary population gain would be little more than the employment increase (see Social Conditions). Similarly, the temporary economic stimulus represented by the non-local work force (and by local purchases of project materials and supplies) would be so small and brief that it should not lead to any indirect or induced employment increases in supporting activities. These conclusions are supported by recent research on the socioeconomic impacts of transmission line construction projects (Mountain West Research, Inc. 1981b), which found that the nature of these projects generally limited their local economic impacts to temporary increases in business activity.

Construction in the Eugene area would be the responsibility of BPA. Once work began, the only agency personnel directly involved would be the construction inspection staff, which would probably consist of a chief inspector and three other inspectors. They would be present for the single construction season during 1985. Actual line construction, including clearing and excavation, as well as tower assembly, erection and conductor stringing, would be done entirely by private contract. Workforce size is difficult to project, since BPA has no control over the number of workers or their origin. Experience on similar projects indicates that approximately 35 to 45 workers would be needed to

complete construction (Beraud 1982b). An estimated minimum of 25 percent of that total, or 8 to 10 workers, would be hired from the local area; the actual local/non-local distribution would depend largely on the home location of the prime contractor. Most of the general work such as clearing and access road construction could be performed by local crews, while a smaller proportion of workers for the more specialized tasks such as conductor stringing would be local hires. Due to the small construction workforce required for the BPA portion of the proposed line, the local labor force effect on economic activity in the Eugene area would be insignificant and would parallel the effects described previously for the Pacific portion of the line.

The most noticeable economic effects of the project would probably be slight increases in expenditures in some highly localized areas, due to the partial re-spending of payrolls by non-local workers. Based upon typical construction cost data, the total construction payroll is projected at approximately $12.8 million (in 1982 dollars), expected to be divided equally between the two phases of project construction (Higgins 1981a; USDOE BPA 1980b). Total labor income for the Dixonville-Meridian phase of the project ($6.4 million) would be equivalent to less than 1.5 percent of total annual personal income for Josephine County (Technical Investigations Report, Sec. 7.3).

If the non-local share of total project payroll is estimated at 45 percent, the non-local payroll would be nearly $2.9 million for each phase and about $5.8 overall. Assuming that 70 percent of gross pay is disposable income and that non-local workers would spend 40 percent of their disposable income in the local area, expenditures by these workers would total approximately $1,625,000. The Grants Pass and Cottage Grove areas would receive the largest shares of this total, but worker (both local and non-local) expenditures would be distributed in an unpredictable pattern throughout many communities near the project. The aggregate spending effects would not be significant, although individual proprietors might realize substantial increases in trade. Most of the increased spending would occur in the service and retail trade sectors of the local economies.

These employment, income and related impacts would be very similar across all alternatives and options. The size of the construction crew should be essentially the same for each alternative, although the double circuit alternative would probably take somewhat longer to construct and would have a larger total payroll. Total labor income for the double circuit alternative would probably be on the order of $19 million, with a non-local share of about $8.5 million. Selection of any of the options would have at most a marginal effect on total payroll and socioeconomic effects, although some of the options would affect the local-scale geographic distribution of workforce impacts. For example, selection of Option H over the preferred alternative for the Medford Basin would shift a portion of local construction worker expenditures and activities from the Shady Cove-Eagle Point and Brownsboro areas to some of the communities on the western side of the Medford Basin.

EFFECT ON RATEPAYERS

The cost of the proposed 500 kV transmission line would be borne by Pacific's industrial, commercial and residential customers, hence electric bills would be expected to rise to cover the cost of the project. Under existing regulatory practices a system improvement such as the proposed facility would be spread over five states in Pacific's six-state service area. The actual rate impacts to customer bills are difficult to predict, as some state rate-setting agencies could disallow any of the project cost to be applied to Pacific's customers in their state or grant a request by Pacific to recover the cost of the project in its entirety. Rate schedules also vary significantly across jurisdictions and ratepayer classes. Further complexities in predicting the rate impact of the project arise as a result of Section 5(c) of the Pacific Northwest Power Planning and Conservation Act.

For Pacific's six-state service area, total annual revenue requirements would increase by approximately $16,000,000 to cover the cost for construction, operation and maintenance of the facility as proposed. The Oregon portion of the total annual revenue requirements would be approximately $9,000,000 or a two percent increase in current Oregon revenues (approximately $425,000,000). As some fixed components of the transmission facility depreciate at different rates and as other expenses such as operation and maintenance are non-fixed and escalate with inflation, the annual revenue requirements could slightly decline over the 40 year economic life of the facility.

For a residential customer in Pacific's Oregon service area using an annual average of 14,000 kilowatt hours per year, rates would increase by approximately $6.00 per year (for electric space heating customers, approximately $9.00 per year).

These rate increases would be reflected in customer bills for each year of the estimated 40 year economic life of the transmission facility. While the amount for each customer appears small, there would be a long-term effect.

The increase would be substantially greater for Pacific's commercial and industrial customers, whose usage is significantly greater than residential customers. The rate increase would become embedded in the price structure of all goods and services these customers produce and sell in the region.

Each million dollar increase in project cost for the proposed facility would result in an annual increase in revenue requirement of approximately $230,000.

The cost of the BPA construction would be borne by BPA customers throughout the Pacific Northwest. The actual increment of cost directly related to the proposed line would be indiscernible on an individual basis.

NO ACTION ALTERNATIVE

A decision to adopt the no action alternative could result in several types of adverse consequences to Pacific's transmission and distribution system, which could in turn adversely affect economic activities in the southern Oregon-northern California service area. In general, the adverse electrical consequencues could range from intermittent low voltage conditions to occasional short-term outages to major outages and/or severe restrictions in additional load growth. The chances of the more severe electrical consequences occurring would depend upon several uncertain factors, including the probability of normal outages when system back-up capacity is not available, the probability of forecasted peak loads actually occurring, and consumer response to warnings of short-term system overloads or long-term restrictions on load growth.

The economic consequences associated with these types of electrical system failures would increase in severity with the duration and extent of the system failures. The effects of a brief, highly localized outage (with dropped loads) or low voltage period would primarily be limited to personal inconvenience, for example. Alternatively, a black-out of the Grants Pass area for several hours during a weekday would have significant economic costs in the form of lost output, wages and other damages. Businesses dependent upon continuous and reliable electric service would probably move out of the service area if outages became frequent, while the most severe system consequence of a load growth moratorium could conceivably lead to economic stagnation unless alternative energy sources were employed.

The economic impacts of the no action alternative cannot be accurately predicted or quantified because of the degree of uncertainty present, but some indications of the range of possible economic effects can be provided. Studies conducted in the U.S. between 1969 and 1976 found power outage costs across all consumer classes ranging from $0.33 to $1.17 per kilowatt-hour (KWh) of power not delivered, with studies from the highly industrialized northeastern states accounting for the high end of the range (USDI BPA 1977c). Pacific's contingency plan for energy conservation during periods of resource deficiency, required by the Oregon Public Utilities Commission, provides for a surcharge on excess power usage during Stage 2 of mandatory curtailment (Pacific 1982b); these surcharge rates range from $0.04 to $0.06 per excess KWh, and probably represent an approximate minimum unit value for power not delivered.

An alternative method of estimating the impacts of power curtailment is to focus upon employment, and attempt to identify employment which might be lost during a period of power shortage. The Pacific (1981c) Southwest Division forecast estimates that manufacturing employment in the area will be 33,539 workers in 1985, and that industrial electric sales in the same year will be nearly 1.3 million megawatt hours (MWh) or 25 percent of total area sales. If that industrial demand also

represents 25 percent of the forecasted 1985-86 peakload of 1,590 MW, the resulting figure of 397.5 MW can be converted into a crude employment/energy ratio of 84.4 workers per MW of industrial peak demand.

The forecasted 1985-86 winter peak load of 1,590 MW is 108 MW above the existing transmission system capacity of 1,482 MW. If the 108 MW shortfall occurred for one week and was met by mandatory curtailment of industrial power, resulting in temporary lay-offs or plant closings, the result could conceivably be a short-term loss in industrial employment of 9,115 workers (108 MW x 84.4 workers/MW). Based upon annual earnings figures for the dominant wood products industry, such a one-week curtailment could cost workers about $3.6 million in lost wages.

These figures are a representative case of some of the economic effects which could occur if continued load growth pushed peak demand above the existing transmission system capacity. The above figures might overstate the potential loss of employment amd earnings because they ignore the potential for energy curtailment in other sectors and because energy intensity varies among industries. Conversely, the one-week curtailment scenario does not account for the possibility of other 1985-86 peak load levels above the system capacity of 1,482 MW but below the projected maximum peak of 1,590 MW. Such lesser shortfalls could conceivably occur several times during the winter of 1985-86, with the wage and employment effects of each occurrence depending upon the time of day the peak occurs (a morning peak and resulting curtailment would have more serious effects than an afternoon peak) and its duration.

The proportion of the total service area electric load which would be exposed to curtailment would increase in every year after 1986, if load growth continued and the transmission system capacity were not increased. The potential capacity gap, and the projected peak demand which would create the shortfall, are based upon forecasted annual demand growth of 5.6 percent through 1985-86 and 3.8 percent from 1985-86 through 1988-89 (see Table 1-1). These growth rates are somewhat higher than the Oregon Department of Energy forecast for the state, which projects annual average growth of 3.5 percent through 1986 and 2.2 percent from 1986 to 1991 (Pacific 1982c). If the ODOE forecast rate were applied to Pacific's Southwest Division loads, the resulting 1985-86 peak load would be 148 MW below Pacific's forecast. The result of load growth at the lower ODOE forecast rate would forestall the capacity gap and the need for the proposed transmission line by about 1.5 years. Despite the uncertainty surrounding future electric demand and curtailment patterns, it is clear that the no action alternative could lead to highly significant adverse economic impacts if forecasted loads materialize.

SOCIAL CONDITIONS

Potential social impacts of the proposed transmission line primarily relate to construction work force activities, possible electro-magnetic effects of the operating powerline, and the attitudes and perceptions of residents near the corridor. The preferred alternative and Alternatives 2 and 3 would create unavoidable social impacts of this nature. The impacts of construction activities would be minor and temporary, while the other effects would largely be mitigated by various actions, although some impacts such as changes in attitudes of residents near the corridor might persist. Implementation of Alternative 1, the no action alternative, could involve more significant and widespread social impacts associated with the restriction of electrical loads.

CONSTRUCTION WORK FORCE

Social impacts due to construction activities and an influx of construction workers would be minimal. As described in the economic discussion, it is expected that under normal labor conditions 60 to 70 percent of the maximum 200 construction workers would be hired locally. The remaining 60 to 80 workers would be from non-local crews, and would be joined by about 25 inspectors and supervisors.

Research on transmission line workers and the local social impacts which they create indicates that even small communities have not experienced serious social impacts as a result of recent transmission line projects (Mountain West Research, Inc. 1981b). Surveys of workers on several projects in the Northwest showed that transmission line workers tend to be older on average than construction workers on fixed-site projects such as power plants (about 35 years vs. 23 to 25 years), have smaller families, and bring fewer dependents with them to the job site. Approximately 67 dependents were estimated to accompany every 100 workers, indicating that the non-local workers (including supervisors) on the Eugene-Medford 500 kV project could be expected to create a population influx of 140 to 175 persons. Additionally, non-local transmission line workers tend to establish temporary residence in communities which are large enough to provide sufficient amenities, while many bring along their own temporary housing in the form of travel trailers or other recreational vehicles. Overall, no problems concerning strained demand for public services and facilities were reported in any of the towns surveyed, which included several communities of 500 or fewer residents (Mountain West Research, Inc. 1981b).

Given the size of Cottage Grove and Grants Pass, about 7,200 and 15,000 persons, respectively, the demands of the non-local workers for transient housing and other private and government services could easily be accommodated at these anticipated staging areas. Residents near the transmission route might notice increased traffic along some

local roads during construction, but these effects would be highly localized and temporary due to the dispersion of work crews along the corridor. Overall, the social effects of the construction workforce within the surrounding area would be insignificant.

NOISE

The operation of construction equipment would cause localized, temporary noise levels which could be significant to individuals, depending upon distance, weather, topography, individual sensitivities, and other factors. Noise levels at a distance of 50 feet range from 70 to 96 dBA (decibels on the A scale) for various types of internal combustion powered equipment, and up to 106 dBA for impact tools and equipment (USDI BPA 1977b). Impact equipment is used very infrequently and for short periods of time during construction, primarily in the establishment of tower foundations. Contribution to hearing impairment begins at 70 dBA, a noise level which is equivalent to freeway traffic at 50 feet, while sustained noise levels of 90 dBA can cause hearing damage.

Normal attenuation or lessening of noise from a point source is 6 dB per doubled distance (USDI BLM 1977b; Wilson 1982). Intermittent construction noise above 90 dBA (equivalent to the noise of a heavy truck 50 feet away) can therefore be expected on an infrequent basis outside the few residences which would be along the right-of-way. Noise levels inside residences near the construction would be much lower, as outside walls of houses would typically reduce high-frequency noise levels by 20 to 25 dB (Wilson 1982). Overall, construction noise would be intermittent and of short duration on a daily basis, while construction equipment would probably not remain at any given location for more than one week (USDI BLM 1977b). Noise from construction activities may also be audible as background noise at distances of one mile or more from the right-of-way. Blasting is not anticipated as a normal construction activity. Measures which would be taken to minimize construction noise are described in Appendix A.

Transmission lines also create some long-term noise effects through operation and maintenance. Use of helicopters for patrolling the transmission line might cause some intermittent, short-term noise for nearby residents, but this would occur infrequently.

The proposed transmission line would produce some operational noise effects associated with transmission line corona. Corona produces crackling and humming noises, particularly during foggy, very wet, or otherwise adverse weather conditions. Through careful selection of conductors and bundle configuration, corona noise from the proposed transmission line would be held to 50 dBA (the noise level of light auto traffic 100 feet away) at the edge of the right-of-way (Pacific 1981b). Normal attenuation would reduce this noise level to about 40 dBA, the typical sound level in a library (USDI BPA 1977a) at

approximately 300 feet from the centerline. Previous BPA experience indicates that residents living near a transmission line can be expected to complain if the average noise level is in the range of 53 to 59 dBA (USDI BPA 1977a). Substations emit varied noises of differing frequencies, some of which are louder than corona noise. Transformers in particular emit a low-frequency, long-wavelength hum which penetrates walls and can be very annoying (Wilson 1982). Public access to substations is controlled, thereby limiting the noise impacts of these facilities. Modification of the Dixonville Substation within the existing property should not lead to an increase in the noise level at the residences and the school located near this facility.

Overall, noise impacts of the proposed line would be held to acceptable levels through the efforts of the constructing entities, BPA and Pacific. BPA would conduct its activities on the northern portion of the line in compliance with regulations established under the federal Occupational Safety and Health Act of 1970 (29 U.S.C. 553), and guidelines issued by the U.S. Environmental Protection Agency under the Noise Control Act of 1972 (42 U.S.C. 4901 et seq.). BPA follows the intent of the Noise Control Act and subsequent Executive Order 12088, which is for federal agencies to comply with state and local noise standards (USDOE BPA 1980a).

Pacific would be required by EFSC to conduct its activities in conformance with the Noise Standards of the Oregon Department of Environmental Quality, set forth in OAR 340-35. The proposed transmission line would be covered by the standards for new industrial and commercial noise sources, which allow median noise levels at the nearest noise-sensitive property (residences, churches, schools, etc.) of 55 dBA during daytime hours (7 A.M. to 10 P.M.) and 50 dBA at night (OAR 340-35-035). Standards for intermittent noises above these levels allow nighttime (the controlling standard) peaks of 55 dBA during 10 percent of any given hour, and 60 dBA during 1 percent of any given hour. In addition to these basic standards, new corridor and parallel transmission segments may need to comply with a degradation standard for "previously unused sites," which would allow an increase of no more than 10 dBA over the previously existing ambient noise level (Wilson 1982). Transformers and equipment emitting low frequency noise in the 125 Hertz octave band would have to comply with median octave band standards, which would allow median levels of 61 dB during the day and 56 dB at night, with a maximum increase of 15 dB over existing levels (Wilson 1982, OAR 340-35-035).

ELECTRIC AND MAGNETIC EFFECTS

All transmission lines create some risk to human health through line failures or inadvertent contact with conductors. Energized conductors can fall to the ground due to damage from vandalism, storms or landslides, resulting in a very brief hazard (about 1/2 second) before the line is automatically switched off (USDOE BPA 1980a). There also

is a slight collision hazard for low-flying airplanes. The risk of electrocution through accidental conductor contact with irrigation pipe or other objects is somewhat higher, but is minimized by siting to avoid irrigated agricultural areas, increasing the minimum clearance between the conductors and the ground from 38 to 42 ft. in agricultural lands (Pacific 1981a), and by distributing information concerning such hazards. Moreover, the contact hazard associated with the proposed 500 kV line would be less than for the existing 230 kV line, because conductor height from the ground increases with voltage. Pacific and BPA both have standard grounding specifications for fences, buildings and other objects near or in the right-of-way, which minimize induced current in these objects and the resulting risk of nuisance shocks (Higgins 1981b, USDOE BPA 1978). These specifications are in accordance with the National Electric Safety Code.

Energized transmission lines also produce electric and magnetic fields in their immediate vicinity. The maximum electric field strength measured at one meter above ground level under a 500 kV line typically is about 8 kilovolts per meter (kV/m), usually occurring just beyond the outer conductor; this level typically diminishes to 2.5 or 3.5 kV/m at the edge of the right-of-way (USDI BPA 1977a). Pacific estimates that the maximum electrical field for the proposed line would be less than 7.7 kV/m (Fishback 1982). The earth's electric field at ground level averages 0.13kV/m, and can rise to 3 kV/m during storms (USDI BPA 1977a). The magnetic field from a 500 kV line measured at a height of one meter above the ground ranges from about 0.05 gauss at 100 feet from the centerline to just over 0.3 gauss at the centerline, while the maximum for a double circuit 500 kV line would be about 0.6 gauss (USDI BPA 1977a). In comparison, the earth's magnetic field strength is also about 0.6 gauss, while a television set creates a magnetic field of over 0.8 gauss within 6 inches of the set.

Although there has been public concern over the health effects of long-term exposure to electric and magnetic fields, scientific research conducted to date has not concluded that 500 kV transmission lines (or other high-voltage lines) constitute a health hazard (USDI BLM, USDA Forest Service, USDOE BPA 1981c). While research on potential field effects is continuing, comprehensive reviews of the extensive body of existing research literature (USEPA 1980; ODOE 1980; USDI BPA 1977a) indicate that the proposed line would present no significant health hazard to people or animals.

Pacific and BPA would comply with the State of Oregon standards concerning electric fields, as established by EFSC (OAR 345-80-055). These standards require that electric field strengths not exceed 9 kV/m one meter above the ground surface in the areas accessible to the public, that induced currents be as low as reasonably achievable, that the applicant agrees to an adequate grounding program, and that the transmission line be designed, built and operated consistent with the National Electric Safety Code.

The proposed transmission line might create interference with reception of radio and television signals. Previous experience has indicated that 500 kV power lines occasionally interfere with television and AM or CB radio signals (USDOE BPA 1981c). Such interference is generally limited to wet weather conditions and relatively remote locations where broadcast signals are weak. Restoration of radio and television reception at residences and commmercial establishments to the original level is a binding EFSC standard (OAR 345-80-055) with which Pacific and BPA would comply. As a matter of policy, both Pacific and BPA consider effects on other telecommunications facilities as well, such as those owned by telephone companies and railroads.

HERBICIDES

Use of herbicides to control vegetation within the right-of-way is likely to be a public issue associated with the project. Herbicide use in timber management and other vegetation control activities is controversial, and many Oregon residents strongly oppose herbicide use because they believe that it is harmful to the environment and to human health. Potential adverse effects associated with herbicide use for the proposed transmission line would be minimized through the standard practices described in Chapter 1: herbicide use would be limited to ground application, except possibly along the BPA portion of the line; extreme care would be taken in regard to drift during application; handcutting and stump treatment would probably be used in sensitive areas where great selectivity would be required; and individual landowners would be able to enter into Tree and Brush Agreements to prevent the use of herbicides along their property. While these measures would effectively preclude any human health effects associated with herbicide use during maintenance, it is doubtful that they would preempt all criticism and concerns of the opponents of herbicides. Accordingly, some social opposition to the project on the grounds of herbicide use is likely to be unavoidable.

OTHER SOCIAL EFFECTS

The remaining social impacts relate to the proposed action's effects on local residents' attitudes and perceptions. Transmission lines (and construction activities in general) can stimulate adverse emotional responses in some individuals, particularly among persons who live close to the transmission route. Such responses can stem from annoyance at the more tangible effects described previously, such as noise or radio or television interference. Transmission lines and other rights-of-way can also lead to unauthorized use, particularly by motorcyclists or other off-road vehicle users, which often is viewed as a problem by residents along or near the right-of-way. Despite installation of gates and other restrictive measures, such unauthorized use cannot be eliminated. Other causes of adverse social reaction can be concern over perceived human health risks, or simply resentment of

intrusion (often visual) upon established routine and conditions. Regardless of cause, these reactions are unavoidable if a transmission line is built.

ALTERNATIVES AND OPTIONS

The potential social impacts of the project should be considered essentially equal for all of the transmission alternatives. Social effects are highly subjective, and difficult to measure on a standard basis. Accordingly, the count of residences which would be within 1,000 feet of the right-of-way appears to be the best substitute measure of the extent of social impacts, as in most cases this represents the population which would be most directly affected; this particularly applies to noise, electric and magnetic effects, and the "other social effects" described above.

The preferred, parallel and double circuit configurations may involve some differences in the level of effects based upon the number of transmission lines which would exist in a given location, but these differences would not be substantial. For example, the operating noise level of the parallel alternative would not be the sum of the noise from the 500 kV line and the existing 230 kV line(s); rather, when unequal sound levels are combined the resulting sound is 1 dB above the higher sound level (Douglas County Planning Department 1980). Similarly, the voltages of multiple transmission lines within a single corridor are not additive in terms of electric field strength; the maximum field strength under multiple lines would not be significantly greater than the field under the highest voltage line (USDI BPA 1977a).

Due to these considerations, neither existing corridors nor new alignments are clearly preferrable in terms of noise and electric and magnetic field effects. The parallel alternative (Alternative 2) would probably entail slightly more risk of line failure or inadvertent contact, as this plan would involve the greatest number of lines and the greatest areal extent of transmission facilities. A double circuit line would probably be considered more of an obstacle to airplanes than a single circuit line, due to the greater height of the double circuit towers. With the exception of the possible new corridor segments, all of the construction alternatives would slightly increase the level of safety risks present, but would not introduce risks which were not previously in existence.

A description of the number and locations of residences within 1,000 feet of the proposed right-of-way was included previously in the land use section and in Tables 1-4, 1-5, and 1-6. Briefly, between 320 and 370 houses and 230 to 290 apartments appear to be located within 1,000 feet of the route of the preferred alternative along the entire corridor. Aside from minor differences due to varying placement of the centerline along most of the parallel alternative, the number of residences within the 1,000 foot zone would be the same for all three

construction alternatives. Among the options, substantive differences would apply to Options B and D and the routing options for the Medford area. Development of Option B, the new corridor option in the Eugene area, would lead to a reduction of from about 290 to 360 units within the 1,000-foot zone as compared to the preferred alternative. The new corridor segment of the preferred alternative above Dixonville would pass near approximately 20 fewer residences than Option D, which would follow the existing corridor.

In the Medford Basin, the preferred alternative would be within 1,000 feet of approximately 20 to 24 residences, compared to 100 to 120 for Option H or L and 130 to 160 for Option I or M. The net differences in favor of the preferred alternative would probably range around 90 units compared to Option H or L and 125 units versus Option I or M. The judgment as to the overall significance of these differences depends upon the perspective and values of the individual. Intuitively, the incremental social effects would be greater on an individual basis for residents along a new corridor, as opposed to an existing corridor. In other words, each individual along the preferred alternative or the new corridor section of Option H might be expected to be affected to a greater degree than a corresponding individual who already lives along a transmission corridor. However, adopting this evaluation posture would require some decision maker to perform the nearly impossible task of calculating such differences in degree of effect, or to weight one group of residents more importantly than another. Alternatively, an equity-based posture could be adopted, in which case all residents who would be affected would be considered equally, regardless of degree. No preference is clearly apparent if the focus is on incremental social effects, while the social effects of the preferred alternative route would be considered least if the latter approach is taken.

The no action alternative would clearly avoid the adverse social consequences of constructing a 500 kV line but could give rise to other adverse social effects, depending upon the unpredictable performance of the transmission system under the no action alternative. If the anticipated loads and/or outage conditions failed to materialize, the transmission system would perform adequately and adverse social effects would not occur. Various intermediate levels of system failure could occur, probably including occasional dimming or flickering of lights, restriction of decorative lighting or other non-essential electric uses, and localized short-term outages. The prevailing social response to these types of events would probably be grudging acceptance or minor annoyance at inconvenience; telephone, written and verbal complaints to Pacific offices and employees would probably increase significantly.

Serious electrical system problems such as extensive outages, curtailment of power to large users, and/or a moratorium on new electric hook-ups could lead to the adverse economic consequences described in the previous section. Assuming the worst case electrical scenario occurred and led to economic stagnation in the service area, social reaction could take several forms. In time, the social and

psychological problems associated with unemployment and declining real income could become significant. Alternatively, economic stagnation could trigger an outflow of population from the service area, perhaps leading to a lower socioeconomic equilibrium level and eventual improvement in the electrical situation. In reality, however, it is quite likely that a serious level of electrical system problems would trigger a vocal regional debate, with the end result being an effort to restore electrical service to an acceptable level.

CHAPTER 4

CONSULTATION AND COORDINATION

CONSULTATION AND COORDINATION

Four organizations, the Bureau of Land Management, Pacific Power and Light Company, Bonneville Power Administration, and the Oregon Department of Energy signed a Memorandum of Understanding prepared in early 1981 regarding their responsibilities on the Eugene-Medford 500 kV Transmission Line project. These four organizations, identified as "cooperating parties" have conducted extensive activities to involve agencies, organizations, and the public in activities related to this project. In addition, Envirosphere Company, the independent third-party preparer of the EIS, consulted with Federal and state agencies, and other organizations and individuals regarding this project. Table 4-1 summarizes these consultation and coordination activities showing which organizations were involved in these activities and when they occurred. It also includes planned consultation and coordination activities associated with ths EIS.

LIST OF AGENCIES TO WHOM COPIES OF THE STATEMENT ARE SENT

FEDERAL AGENCIES

Advisory Council on Historic Preservation
U.S. Department of Agriculture
  Soil Conservation Service
U.S. Department of Commerce
  National Marine Fisheries Service
U.S. Department of Defense, Army Corps of Engineers
U.S. Environmental Protection Agency
  Region X
U.S. Department of Housing and Urban Development
U.S. Department of the Interior
  Office of Environmental Project Review
  Fish and Wildlife Service
  Bureau of Mines
  National Parks Service
U.S. Department of Transportation
  Federal Aviation Administration
  Federal Highway Administration

OREGON STATE AGENCIES

Department of Agriculture
Department of Economic Development
Department of Environmental Quality
Department of Fish and Wildlife
Department of Geology and Mineral Industries
Department of Human Resources
Department of Land Conservation and Development
Department of Revenue
Department of Transportation

TABLE 4-1

CONSULTATION AND COORDINATION ACTIVITIES

	1980	1981				1982		
		January-March	April-June	July-August	September-December	January-March	April-June	July-September
Notice of EFSC and BLM Meetings		1,4						
Scoping Meeting and EFSC Hearing								
Eugene		1,2,3,4						
Roseburg		1,2,3,4						
Medford		1,2,3,4						
Contact Federal, State and Local Agencies		1,2,3,4	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5
Routing Workshop and Public Notice								
Eugene				1,2,3,4,5				
Medford				1,2,3,4,5				
File Site Certificate Application and Distribute Interested Parties					2,4			
EFSC Hearings								
Eugene						1,2,3,4,5		
Medford			2		2	1,2,3,4		
Meeting with Jackson County Commissioners						1,2,4,5		
Draft EIS Issued							1	
Draft EIS and EFSC Limited Appearance Meetings								
Eugene							1,2,3,4,5	
Roseburg							1,2,3,4,5	
Medford							1,2,3,4,5	
Comments Received								1,2,3,4,5

1. Bureau of Land Management
2. Pacific Power and Light Company
3. Bonneville Power Administration
4. Oregon Department of Energy
5. Envirosphere Company

Forestry Department
Parks and Recreation Division
State Historic Preservation Office

LOCAL GOVERNMENT AGENCIES

City of Eugene
  Building Division
  Parks Department
Douglas County
  Board of Commissioners
  Parks and Recreation Department
  Planning Departments
Jackson County
  Board of Commissioners
  Parks and Recreation Department
  Planning and Development Department
Lane County
  Board of Commissioners
  Parks and Recreation Department
  Planning Department
  Public Works Department

Copies of the EIS area sent to numerous individuals involved in the public participation process. Copies are also placed in libraries thoughout the EIS area.

FEDERAL PERMITS REQUIRED

U.S. Department of the Interior, Bureau of Land Management: Grant of Right-of-Way.

U.S. Department of Defense, Army Corps of Engineers: Section 404 Permit.

CHAPTER 5

PREPARERS

PREPARERS

COOPERATING PARTIES PERSONNEL

As described in the Introduction, four agencies were involved in activities which led to the preparation of this EIS. These organizations (Bureau of Land Management, Pacific Power and Light Company, Bonneville Power Administration and Oregon Department of Energy, are defined as the Cooperating Parties with responsibilities described in the Memorandum of Understanding included in Appendix D. The individuals representing these agencies who provided information and otherwise participated in project activities are listed below:

Bureau of Land Management

Philip C. Hamilton
Roland D. Smith

Pacific Power and Light Company

Paul D. Higgins
Kenneth Stevens
Howard Ferris

Bonneville Power Administration

Robert W. Beraud
Michael L. Johns

Oregon Department of Energy

Peter J. Paquet

LIST OF PREPARERS

Envirosphere Company

William D. Kitto, Project Manager

Seven years of experience in conducting and supervising engineering, environmental and energy planning, and environmental impact assessment in both the public and private sectors.

Roger G. Anderson, Resource Planning

Ten years of experience in the design and implementation of resource planning and environmental assessment programs associated with water and land resource development projects.

Donald L. Beyer, Aquatic Ecology

Eleven years of experience in coordinating aquatic monitoring programs and studies, investigating the impact of drilling fluid discharges, and conducting bioassays.

John J. Brueggeman, Terrestrial Ecology

Seven years of expereince in wildlife biology, including study design, coordination, field study, analysis of terrestrial investigations, and impact assessment.

Alan B. Carpenter, Climate and Air Quality

Five years of experience in air quality/air pollution control, air quality site selection surveys, and meteorological monitoring programs.

Ellen S. Cunningham, Land Use and Socioeconomics

Five years of experience in regional land use, water resources, energy resources, and socioeconomic studies.

Karol A. Erickson, Geology, Soils and Water Resources

Three years of experience in geology, soils and hydrology including development suitability studies, reviews of environmental plans, and computer modeling of reservoir operations.

Randal L. Fairbanks, Terrestrial Ecology

Nine nears of experience in the design, coordination, and conduct of comprehensive environmental monitoring programs, ecological research, and ecological inventories.

William F. Hahn, Geology and Soils

Eight years of experience in performance and technical management of geologic and hydrologic investigations for site selection studies, permit applications, water resources evaluations, and environmental reports.

Joel I. Klein, Cultural Resources

Twelve years of experience in cultural resource identification and evaluation for environmental impact statements and assessments of power plants and transmission facilities.

Chris E. Lawson, Socioeconomics and Land Use

Four years of experience in regional planning, economic and geographic research, and socioeconomic reviews and impact assessments.

Edward C. Lesnick, Jr., Economics

Twelve years of experience in economic research, college-level teaching, and conducting economic consulting studies of energy and load forecasting, utility rates and regulatory affairs, power system planning, project evaluation, and socioeconomic impacts.

R. John Little, Terrestrial Ecology

Thirteen years of experience in management, teaching, and research, including the planning and implementation of environmental projects involving terrestrial ecology and floristics, vegetation analyses, and environmental inventories and assessments.

Bruce C. MacDonald, Meterology and Air Quality

Thirteen years of experience in weather forecasting activities, meteorological monitoring programs, dispersion modeling, and air quality impact assessment.

Michael Pavone, Geology and Soils

Eight years of experience in geotechnical and structural engineering for utility facilities, including work on drainage provisions, compaction requirements, erosion protection, stability analyses, field subsurface investigations, foundation design, and preparation of specifications for site development work.

G. Frederick Shanholtzer, Terrestrial Ecology

Sixteen years of experience in supervising and conducting field wetlands and wildlife studies, terrestrail ecological studies, and power plant siting studies.

Frank B. Titus, Geology and Soils

Twenty-eight years of experience in supervising and conducting environmental studies, teaching hydrogeology, and performing geologic research.

Paul White, Hydrology and Geology

Nine years of experience in hydrology and geohydrology, involving sedimentation studies and sedimentation pond design, sampling and general site hydrology, baseline monitoring, and diversion planning.

Diana J. Zamber, Terrestrial Ecology

Five years of experience in fish culture, horticulture, technical research, information systems, public relations, endangered species surveys, general terrestrial ecology, and visual resources.

Jones and Jones

William G.E. Blair, Principal-in-Charge, Visual Resources and Land Use

Twelve years of technical and supervisory experience in architecture, landscape architecture, land use planning, and visual resource assessment.

James Klein, Cartographics and Land Use

Three years of experience, including cartographic work with the U.S. Forest Service and graphics, landscape architecture and land use work in private practice.

Iain M. Robertson, Visual Resources and Land Use

Nine years of experience in landscape architecture, regional and environmental planning, and visual resource assessment.

University of Oregon, Department of Anthropology

(Cultural Resources sub-consultant)

Don E. Dummond, Principal Investigator

Twenty-two years of experience in teaching, research, field investigations, and consulting in the fields of archaeology and anthropology, including four years as director of the Oregon State Museum of Anthropology.

Thomas J. Connolly, Field Supervisor

Five years of experience in conducting and directing cultural resources surveys, archaeological research, and archaeological field investigations.

Eric P. Gustafson, Paleontology

Four years of experience in teaching, research, consulting, and related activities, specializing in the field of vertebrate paleontology.

Garry O. Stephenson, Ethnography and Architectural History

Four years of experience, primarily as an architectural historian with additional work on studies involving archaeology, anthropology, and ethnography.

APPENDIX A

PACIFIC POWER & LIGHT COMPANY
920 S.W. SIXTH AVENUE • PORTLAND, OREGON 97204 • (503) 243-1122

October 23, 1981

Mr. Philip C. Hamilton
Chief, Division of Planning and
Environmental Coordination
Bureau of Land Management
Oregon State Office
Post Office Box 2965
Portland, Oregon 97208

Dear Mr. Hamilton,

To enable your agency to evaluate the environmental impact of construction, operation and maintenance of the Eugene-Medford 500 KV Transmission Line, attached please find a listing of our construction, operation and maintenance practices. It is our expectation that in providing this list, unnecessary lengthy discussions in the EIS of environmental effects in the absence of mitigation and the effects of mitigation can be avoided.

Pacific will implement these practices on public lands. Similar arrangements are negotiated with the private landowner during right-of-way acquisition.

The listed practices are intended to: reduce soil erosion (1, 2, 3, 4, 5, 8, 14, 16, 19, 20, 21, 24); protect water quality (1, 2, 3, 4, 5, 10, 14, 16, 19, 20, 25, 27); reduce impacts on vegetation (1, 2, 3, 4, 5, 10, 11, 19, 24); reduce impacts on fish and wildlife and their habitat (1, 2, 3, 4, 5, 10, 11, 12, 14, 15, 19, 20, 24, 25, 30); protect archeological and historic resources (2, 3, 13, 19); protect public health and safety (1, 2, 3, 6, 7, 9, 10, 12, 16, 18, 20, 21, 23, 27, 28, 29, 30, 31, 32); and to reduce conflicts with current and planned land uses (1, 2, 4, 6, 7, 8, 12, 16, 17, 19, 21, 22, 23, 24, 25, 26, 33).

If we may be of additional assistance in this matter, please advise.

Very truly yours,

Paul D. Higgins

Paul D. Higgins
Pacific Power & Light Company
Project Manager

PDH:sg

Attachments

cc: Messrs. Bill Kitto w/attachments
Bob Beraud
Peter Paquet

CONSTRUCTION, OPERATION, AND MAINTENANCE PRACTICES

1. Any property or resource harmed or damaged by Pacific in connection with the Line will be reconstructed, repaired, and rehabilitated by Pacific.

2. Pacific will locate, design, and construct the Line and related facilities, including access roads, consistent with the criteria jointly established by the Secretary of the Interior and the Secretary of Agriculture and set forth in the publication entitled, "Environmental Criteria for Electric Transmission Systems".

3. Pacific will require its contractors and their employees to be aware of and abide by Rules of Conduct as stated in 43 CFR 6010.2 (1977) when operating on Federal lands. This chapter will be available to all personnel and, consistent with the purposes of the permit, the rules will be strictly followed.

4. Pacific will conduct all construction and maintenance activities in a manner that will minimize disturbance to vegetation, drainage channels, and streambanks. Pacific will utilize soil and resource conservation and protection measures on the land covered by the right-of-way as the BLM determines are reasonably necessary.

5. Pacific will furnish to BLM for approval a clearing and rehabilitation plan which will include clearing methods, site preparation, plant species to be seeded, rate of seeding, and time of seeding of temporary roads, other disturbed areas and waste disposal areas prior to construction.

6. Within ninety (90) days after conclusion of construction operations, all construction wastes including trash, garbage, petroleum products, and related litter, and vegetative debris accumulated through land clearing, will be disposed at an authorized waste disposal area in accordance with an approved rehabilitation plan.

7. Upon completion of construction of the Line, Pacific and the BLM will review Pacific's plan for maintenance of the Line. Either party may request that the maintenance plan be updated to meet changing conditions. Amendments and revisions of the maintenance plan will be subject to the approval of the BLM.

8. Public land areas used for temporary access roads, equipment storage, and other construction activities will be restored by Pacific in accordance with an approved rehabilitation plan.

   Whenever revegetation is required under the rehabilitation plan, Pacific will file a report with the BLM when such planting is completed. The report will contain information regarding the location of

the area; the type of planting or seeding, including mixtures and amounts; the date of planting; and other relevant information as may be required by the BLM.

9. Pacific will construct the Line so that it will conform with all applicable Federal Regulations regarding aircraft safety.

10. Pacific will comply with the applicable federal and state laws and regulations concerning the use of pesticides (i.e., insecticides, herbicides, fungicides, rodenticides, and other similar substances) in all activities/operations under this grant. Pacific will provide BLM a written plan prior to the use of such substances. The plan will provide the type and quantity of material to be used; the pest, insect, fungus, etc., to be controlled; the method of application; and other information that the BLM may require. The plan will be submitted no later than December 1 of any calendar year that covers the proposed activities for the next fiscal year. The use of substances on or near the right-of-way will be in accordance with a BLM approved plan. A pesticide will be used only in accordance with its registered uses and within other limitations imposed by BLM.

11. Pacific will comply with applicable federal and state laws and regulations regarding protected plant and animal species and will conduct construction activities in a manner to avoid or minimize their disturbance.

12. Pacific will cover or temporarily fence the holes excavated for tower footings at the end of each working day for public safety and the protection of wildlife and livestock.

13. Pacific will locate the proposed transmission line facilities when feasible to avoid destruction of archaeological, paleontological or historic values. In the event archaeological, paleontological, or historical evidence is found during ground disturbing activities such as construction of temporary access roads, tower footings, pulling pads, substations, and material sites, Pacific will immediately cease construction activity in that area and notify the BLM. Pacific will not resume construction until authorized by BLM.

14. Pacific will not conduct construction activities within 200 feet of any identified springs unless approved in writing by the BLM.

15. No artificial structure or stream channel change that may cause a permanent blockage to movement of fish will be erected or constructed. Pacific will take all reasonable precautions to protect fish as determined by the BLM.

    Unless otherwise approved in writing by the BLM, dikes or cofferdams, if required, will be installed to separate concrete work areas from lakes or streams during construction. Mobile ground equipment will be kept out of the waters of lakes, streams or rivers except as permitted by the BLM.

16. Pacific will conduct all construction, operation and maintenance activities in a manner that will avoid or minimize degradation of air, land, and water quality. Toxic material will not be released in any lake or water drainage. All construction work and subsequent use of the right-of-way will be consistent with applicable federal, state and local laws and regulations relating to safety, water quality and public health.

17. If Pacific requires materials for construction purposes from the public lands, application will be made under applicable regulations for such materials. Material will not be removed by Pacific without the written approval of the BLM.

18. When necessary during construction, Pacific will provide warnings, flag men, barricades and other safety measures to protect from hazards associated with the project.

19. All construction and vehicular traffic will be confined to the right-of-way or designated access routes, roads or trails unless otherwise authorized by the BLM in writing. All temporary work roads to be used for construction will be rehabilitated after construction of the Line in accordance with the approved rehabilitation plan. All permanent access roads on public lands will be restored to conditions acceptable to BLM. Any drainage deficiencies will be corrected to reduce future soil erosion.

20. Culverts or bridges will be designed to carry a reasonable peak flow if required for temporary roads crossing water courses, unless waived by the BLM. Stream channels will be restored as close as possible to the original condition if culverts and bridges are removed after construction.

21. Pacific will work closely with representatives of all governing agencies in solving access road problems.

22. Pacific will minimize disturbance to existing fences and other improvements on public lands. Pacific will promptly restore any damaged improvements to at least their former state. Functional use of these improvements will be maintained at all times. When necessary to pass through a fence line, the fence will be braced on both sides of the passageway prior to cutting of the fence. Stress panels or rock jacks will be constructed and installed according to BLM standards. Gates will be installed during construction and will be closed at all times when not in use. When a road or construction activity breaks or destroys a natural barrier used for livestock control, the gap thus opened will be fenced to prevent drift of livestock. When construction has been completed, the BLM will identify the gates which Pacific will replace with a stationary section of fence.

23. Pacific will ground all permanent gates, cattleguards or other objects or structures that could become inadvertently charged with electricity.

24. Right-of-way clearing in timbered and scenic areas will be done in accordance with an approved clearing plan and will be limited to a minimum width necessary to prevent interference of trees and other vegetation with the transmission facilities. If any merchantable timber is involved in right-of-way clearing it will be harvested in accordance with the terms of a BLM timber sale contract.

25. No water sources on federal lands will be utilized without written permission of the BLM.

26. Reasonable precuations will be taken to protect, in place, all public land survey monuments, private property corners, and forest boundary markers.

27. Fully contained sanitation facilities in personnel and material marshalling areas will be installed. Construction personnel will be required to utilize existing sanitary facilities where possible. All waste from temporary sanitary facilities will be transferred in appropriate containers to an approved disposal area.

28. The line will be designed to reduce electric and audible noises from operation to practial levels. The transmission line will be designed to meet requirements of the National Electric Safety Code.

29. The transmission line and associated facilities will be maintained to standards of repair and safety criteria acceptable to the applicable regulatory agencies having jurisdiction.

30. Noise producing equipment will be located to minimize sound radiating to the surrounding areas. If usage of pneumatic-tools or equipment used in chipping operations during tree removal or trimming is necessary near residential properties, such use will be restricted to daylight hours.

31. During construction, water trucks will be used to control dust where necessary or desirable in the vicinity of neighboring residents or agricultural developments.

32. Contact will be attempted with directly affected property owners and residents to inform them of the planned project and what may be expected during each construction phase, such as the hours of operation and types of construction equipment that would be used in the area.

33. Prior to construction, Pacific will measure radio and television signals, along with ambient RF signal noise levels at residences and commercial establishments located near the line route. Pacific will restore the reception of radio and television at residences and commercial establishments in the primary reception area to the level present prior to operation of the line. This restoration will occur at no cost to residents experiencing interference resulting from operation of the line.

PACIFIC POWER & LIGHT COMPANY
920 S.W. SIXTH AVENUE • PORTLAND, OREGON 97204 • (503) 243-1122

April 12, 1982

Mr. Phillip C. Hamilton
Chief of Planning and Environmental
Coordination
Bureau of Land Management
P. O. Box 2965
Portland, OR 97208

Dear Mr. Hamilton:

As a result of our review of the preliminary draft EIS and discussions on March 29 and 30, Pacific Power & Light Company will commit to do the following actions identified as possible mitigation measures in the PDEIS.

1. Pacific will use non-reflective conductors from Spencer Switching Station to Dixonville south to the Canyonville bypass. Non-reflective conductors will also be used from the point where the proposed line enters the Evans Creek Valley south and east to the Meridian Substation.

2. Pacific will use non-reflective tower steel in the following areas:

   From the North Umpqua River to the North Umpqua highway and into Dixonville if Option D is not selected; along Option E; along Option I and M through Sam's Valley to the Rogue River and then east of Crater Lake highway to Meridian; along H and L from Lyman Mountain to the Rogue River and then from Crater Lake highway to Meridian; and along the Rogue Valley crossing on the preferred alternative and Alternative K.

3. Pacific will establish through selective clearing and a vegetation planting program a screen of vegetation on the banks of the selected Rogue River crossing.

4. It is recognized that construction activities could interfere with Columbia white-tailed deer fawning near the North Umpqua River. However, current construction schedules do not contemplate being within one mile of the North Umpqua River crossing between May 15 and July 15 as construction would proceed from north to south. If, due to unforeseen circumstances, this schedule could not be used, Pacific would agree to a determination by the Oregon Department of Fish and Wildlife upon their review, prior to construction, that construction should be suspended during this time period.

5. Once initial detailed engineering designs are completed and access roads and construction pads and tower locations are identified, Pacific will agree to an on-the-ground review by qualified botanists. Following their review, Pacific will modify these plans as appropriate to avoid adversely affecting Phacelia capitata, Sidalcea campestris and Limnanthes floccusa sp. Grandaflora. All construction workers will

be required to confine their activities to identified construction areas. If existing structures are removed, they will be removed in a manner that would avoid adversely affecting these species. Herbicides will not be used in these areas. For those areas of the selected route that have not been surveyed for endangered and threatened plant species but which have a high likelihood of containing the requisite habitat, similar on-the-ground investigations would be conducted in those areas and plans would be modified as appropriate.

6. On areas of the selected route which have a high likelihood of containing archaeological resources, on-the-ground surveys will be conducted by a qualified archaeologist and any sites so found will be handled in accordance with previously established procedures.

7. If the preferred alternative is selected for the corresponding portions of Option E (Canyonville), F (Green Mountain), and G (West Fork Evans Creek), Pacific will relinguish its easements for those areas with the exceptions of the easements north of the section line between sections 35 and 2; Township 30 South, Range 5 West, (Option E). Pacific will retain its easements through Sam's Valley for future local requirements.

We trust that the analysis of the environmental effects of our proposal would reflect these commitments.

Sincerely,

Paul D. Higgins

Paul D. Higgins
Project Manager

PDH/ka

cc: Peter Paquet
Bob Beraud
Bill Kitto

APPENDIX B

APPENDIX B

EXISTING VISUAL AND LAND USE CONDITIONS ALONG OPTIONS B, C, D, AND NEW ALIGNMENTS IN THE MEDFORD BASIN

This appendix describes the existing visual and land use conditions on those segments of the alternatives and options near Eugene, Roseburg, and Medford which do not follow the alignment of the existing 230 kV line from Spencer Switching Station to Meridian Substation. The Technical Investigations Report describes the baseline conditions along the existing corridor and the description of these segments follows the format used in that report even though this appendix analyzes both existing and potential corridors. Detailed area-wide analyses of conditions in the Eugene and Medford areas are covered in the Routing Study Report.

OPTION B: TWIN OAKS/SPENCER CREEK/HILLS BETWEEN SPENCER BUTTE AND CAMAS SWALE

This route option extends south from Twin Oaks across Spencer Creek Valley through the hills south and west of Fox Hollow Road to a point north of Camas Swale Road where it enters the narrow creek valley (approximate length 7 miles).

Visual Character, Topography, and Landform: Throughout this area, the line passes through the gently rounded hills south of Spencer Butte and Eugene. Spencer Creek, approximately 1 mile south of Twin Oaks, drains a broad, shallow valley. With the exception of this valley and the southern end of the segment, the land is hilly and views are not extensive. Where the line joins the existing corridor at the south end of this route option, it enters Camas Swale Creek Valley at the point where the valley opens to the western, gently sloping edge of Camas Swale, a broad, flat, open plain. The last 1 to 1 1/2 miles of this segment are parallel to the narrow Camas Swale Creek valley across the face of the hills to its north.

Vegetation and Land Use: The majority of the area through which this segment of the line passess is covered by forest, much of which has been logged recently. This forest is almost entirely Douglas fir and varies from recently cleared or young growth areas to smaller areas of mature growth. This forest has a closed and dense visual character in comparison with the more open mixed deciduous and evergreen woods that are common in the vicinity of Roseburg and the Medford Basin. Spencer Creek valley and Camas Swale contain the most extensive open areas along this segment. Both of these valleys are extensively farmed for crops and hay, but fields in the former valley are considerably smaller. Between these two open areas, the route crosses or passes along the edge of several small clearings which are occupied by residences. Throughout much of this segment, land uses are changing

from agriculture and forestry to rural residential development. This is particularly common along the roads that give convenient access to Eugene.

Visibility of Line from Roads: The proposed line crosses McBeth Road a short distance south of where it joins Lorane Highway and Fox Hollow Road near its intersection with McBeth Road. The former crossing will be more visible than the latter, as it occurs in Spencer Creek Valley, but views will be limited by the trees and the surrounding slopes. The Fox Hollow crossing is proposed in a densely wooded area where the road winds considerably, so views of the crossing will be restricted to a short length of the road. The line will also be partially visible from Camas Swale Road which runs along the south side of the creek valley. Intervening riparian vegetation and trees on the lower slopes of the valley will help obscure the line, which will be approximately 1 mile away on the other side of the valley.

Visibility of Line from Houses: At the proposed crossing of McBeth Road there are only 2 houses within 1000 feet of the line, both near the outer limit of this zone. There are no houses at the proposed crossing of Fox Hollow Road. In several locations where the line runs approximately parallel to McBeth Road, the land is subdivided and lots are either for sale or houses are under construction within the 1000 foot zone. There are also approximately 6-8 existing houses within this 1000 foot zone between Spencer Creek and Camas Swale.

Visibility of Line from Parks: At its closest point, the proposed line is over 1 1/2 miles from the top of Spencer Butte and is generally over 2 miles distant. It is possible that portions of towers may be visible from that park, but these will be minor elements in the panoramic 360° view from the top of this hill.

BLM Management Class Designation: There are no BLM lands along this route option and BLM has not developed Visual Resource Management classes for this area.

OPTION C: SPENCER SWITCHING STATION/ALVEY SUBSTATION

This route option traverses the short distance between the switching station and the substation (approximate length, 2 miles).

Visual Character, Topography, and Landform: Almost the entire length of this option is located in the hills southeast of Eugene and northwest of Camas Swale. Alvey Substation, however, is located on flat land at the base of these hills. the hills are generally low, gently sloped, and rounded in this area, although the hillside immediately west of Alvey is steeper than other parts of this segment.

Vegetation and Land Use: The existing corridor is located between the forested upper slopes of the hills to the north and the open pastureland to the south. These pastures are interspersed with woodlands and scrub vegetation appears to be spreading into them. At the eastern end of the route option, where the line bends to the northeast, it crosses a low ridge covered with open woodlands before dropping down into the substation. To the north and east of the substation are Highway 99 and Interstate 5. To the immediate south is a low, isolated hill which separates the substation from a large lumber mill and other industrial and commercial development along Highway 99.

Visibility of Line from Road: Alvey Substation is clearly visible from Highway 99 and Interstate 5, as it is adjacent to both of these highways. The Interstate is elevated at this point, passing over Highway 99, and travellers can look down onto the large expanse of the substation. A large number of existing transmission lines, supported on a variety of structures including steel lattice towers and wood poles, now enter Alvey Substation from the east and west. Curves in both highways and the isolated low hills to the north and south combine to ensure that views of the substation and associated transmission lines only occur for a relatively short length of time. Nevertheless, this segment of the line and the substation are the places where the proposed Eugene-Medford line would be closest to I-5 and most visibile from this designated scenic highway.

Visibility of Line from Houses: There are no houses within 1000 feet of the line along this route option. It is probable that 3 or 4 houses in Camas Swale may have views of the line but their distance from the line and orientation would make the line a relatively minor feature in their views.

Visibility of Line from Parks: Mt. Pisgah, which includes Howard Buford Park, is located 2 miles to the east of Alvey Substation. The line entering Alvey would be visible from parts of this park but would be screened from view from most of the mountain. Because of distance and the presence of other lines in the area, an additional line would be a very minor feature in these views.

BLM Management Class Designation: There is no BLM land in this area and no Visual Resource Management class designations have been made.

OPTION D: NORTH UMPQUA HIGHWAY BYPASS/DIXONVILLE SUBSTATION

This route extends almost due south from the North Umpqua River across State Highway 138 and bends to the southwest into Dixonville Substation (approximate length, 5 miles).

Visual Character, Topography and Landform: This route option was identified as an alternative to the existing alignment to reduce the

visibility of the line from Highway 138; for much of its length it follows the alignment of PPL Line 39. The option diverges from the existing alignment of the Alvey-Dixonville line at the angle point in Oak Creek Valley to the north of Route 138 and proceeds south across the road at almost a right angle into a narrow valley between two parallel ridges running approximately north-south. The route option then follows the alignment of Pacific's Line 39 through this narrow valley into the open valley of the North Fork of Deer Creek in which the Dixonville Substation is located. For almost its entire length, this option is located on the lower east face of a smooth, rounded, long ridgeline which separates it from the valley in which the North Umpqua Highway is located and conceals it from views along this heavily travelled recreation route.

Vegetation and Land Use: The vegetation in this area consists of grassland, open oak woodland, and scattered blocks of fir forest on the ridge to the east of the line. The southern half of the line passes through grassland which covers the ridge to the west and the valley floor of Deer Creek. The length of the line to the north of the North Umpqua Highway is located in scrub oak woods, while south of the highway it crosses open fields.

Visibility of Line from Roads: This section of the line would cross Highway 138 and two small county roads in the vicinity of Dixonville. The point at which the line would cross the highway is on a low, flat section of the road which is visible for only a brief time. This crossing point is far less visible than the existing Alvey-Dixonville line which runs parallel to the highway for nearly 4 miles. The visibility of the line at the road crossing at Dixonville will be very similar to that of the existing corridor since it is located very close to that crossing point.

Visibility of Line from Houses: Option D would be located within 1000 feet of 2-4 farms at the North Umpqua Highway crossing but would not be close to any other residences for the length south to Dixonville Substation.

Visibility of Line from Parks: There are no parks in the vicinity of this option.

BLM Management Class Designation: There is no BLM Visual Resource Management data for this area.

OPTION H, L: WEST ROUTE, MEDFORD BASIN

This route option is a new right-of-way which would extend from Ramsey Canyon southwest along a ridge to the west of Sams Valley to Lyman Mountain. From there it would extend east across Route 234 (Sams Valley Road) and join an existing line running east into Table Rock

Switching Station. From that point it follows the existing alignment to Meridian Substation as described in the Technical Investigations Report (approximate length from Ramsey Canyon to Table Rock Switching Station, 13 miles).

Visual Character, Topography and Landform: For most of its length, this route option is located in the rugged hills to the north and west of Sams Valley. These hills are composed of steep-sided, narrow-topped ridges and spurs. The line is located near the crest of, and approximately parallel to, the first ridgeline west of the valley. The line descends to the main valley floor down a draw or gulch on Lyman Mountain and then runs east across the valley, parallel to Route 234, into Table Rock Switching Station.

Vegetation and Land Use: The mountainous portion of the route option is entirely wooded, although the canopy cover varies considerably due to logging throughout this area. In few locations are the trees very tall. The section of the line in the Medford Basin is mostly located among open oak woods, although at one point it runs across a large pasture. The switching station is located at the base of the north scree slope of Lower Table Rock, which is also covered by open oak scrub.

Visibility of Line from Roads: The proposed line crosses Sams Valley Road (Route 234) at the point where this road leaves Sams Valley and bends southwest into the narrow valley of the Rogue River. At this point views are constricted by topography and vegetation. The road crossing at which an existing line is briefly visible, is rather inconspicuous. The line would also be visible at the base of Lower Table Rock from Route 234 east of the crossing and from other local roads in Sams Valley. The section from Lyman Mountain to the switching station runs almost parallel to and about 1/2 mile south of Route 234 and would not be screened in views from that road by vegetation or topography. If the portion of the line through the mountains were located along the crest of the ridge west of the valley or on the east facing slope of this ridge, then this segment would also be visible on the western skyline from most locations in Sams Valley. If the line were located on the west-facing slope of this ridge, this segment would be screened from view from Sams Valley.

Visibility of Line from Houses: The only locations in which houses are within 1000 feet of the line are at the crossing of Route 234, where 2 ranches are located, and a short distance to the east of this crossing, where another farm is located at the edge of this zone. The discussion of the visibility of the line from roads in Sams Valley also applies to houses in the valley. Houses and farms located along Sams Valley Road would have views of the east-west portion of the line between 1/2 and 1 mile to the south, while more distant views of the portion of the line in the hills to the west would be had by many of the houses in the valley.

Visibility of Line from Parks: This section of the line would be visible from Lower Table Rock and also, at a distance of 3 to 6 miles, from Upper Table Rock. A portion of the former rock is a Nature Conservancy Reserve, while both Rocks are under consideration for designation as Areas of Critical Environmental Concern by BLM. The proximity of the switching station to the north end of Lower Table Rock will make it and the line entering it from the west a clearly visible feature in views from the north rim of this plateau. However, because the alignment is located approximately 600 feet below the elevation of the rock, the segment close to the rock will not be visible from most of the top of either Table Rock. There will be more distant views of the line on the ridge to the north and west of Sams Valley, but this line will be over 4 miles from Lower Table Rock and if the line is not located on the crest of the ridge it is unlikely to be a dominant feature in views from this natural feature.

BLM Management Class Designation: The primary BLM concern in this area is with the proposed Areas of Critical Environmental Concern on the two Table Rocks, which have been discussed above.

PREFERRED ALTERNATIVE AND OPTION K: RAMSEY CANYON/HILLS NORTH AND EAST OF MEDFORD BASIN/ROGUE RIVER

This section of the preferred alternative would be on a new right-of-way, which passes north and east of the Medford Basin and enters Meridian Substation from the northeast (approximate length, 27 miles).

Visual Character, Topography and Landform: With the exception of several small valleys, which this segment of the line crosses, all of this area is within hilly or rugged topography.

East of Ramsey Canyon the route crosses the southern edge of a gently sloping or rolling area which drains into Evans Creek and then travels eastward to the Rogue River through moderately steep ridges with elevations up to 2,500 feet. The Rogue River Valley in the vicinity of the crossing is approximately 1 1/2 miles wide, with the river running close to the western edge of the flat valley floor. East of the river valley the hills are higher but less dissected and slopes are generally less steep, although there are also areas of steep topography here. Where the line crosses Little Butte Creek and Highway 140, there is a narrow valley with a flat floor approximately 1/2 mile wide. To the south, the topography again becomes steeper and more varied. The route crosses two more small valleys at Yankee Creek and Antelope Creek; in the first valley, there is a small reservoir to the west of the proposed corridor. Meridian Substation is located towards the upper end of Dry Creek valley, with Roxy Ann Peak (elevation 3,571) to the west and high hills to the east.

Vegetation and Land Use: With the exception of the valleys described above, this section of the line is located among hills which are sparsely wooded. These woods are predominantly oak with some evergreen trees and contain frequent open areas with scattered small trees. Portions of these wooded hills are used as rangeland and there are subdivisions located in the hills to the west of the Rogue River Valley, to the north of the Highway 140 crossing, and on the ridge between Antelope Creek and Meridian Substation. Lots in these subdivisions are large and houses are scattered, rather than clustered. In the gently sloping areas and flat valley floors along this route, there are hay fields and occasional croplands. This farming pattern occurs to the west of Ramsey Canyon in the open valley bottom near Evans Creek, in the Rogue River Valley, and in Little Butte, Yankee, and Antelope Creek Valleys.

Visibility of the Line from Roads: This section of the proposed line crosses two major roads, State Routes 62 and 140, and many local roads including roads in the Evans Creek area, Rogue River Drive, Butte Falls Road, and Antelope Road. The line would be clearly visible from all of these roads; however, the length of time for which it is visible will not be very long except at Antelope Creek Road, which is long and relatively straight to the west of the road crossing point. The Environmental Impact Statement discusses the visibility of the line from Crater Lake Highway (Route 62) and Rogue River Drive in detail.

Visibility of Line from Houses: There are houses scattered throughout this area, both in the subdivisions described above and along many of the roads. Where the route passes through the open area near Evans Creek, there are approximately 4 or 5 houses within 1000 feet of the line. At the Rogue River Crossing there are 3-4 houses within 1000 feet of the line on the west bank of the river and 3 houses between Crater Lake Highway and the river. On the east side of the highway as the line climbs over a low spur, there is one house at the outer edge of this zone. From there south, there are no houses close to the line until it reaches Brownsboro. In this area of scattered houses north of Highway 140, there are 3 or 4 residences within 1000 feet of the line. South of 140, there are 3 houses very close to the line. Houses at Yankee Reservoir are located on the west side of the reservoir, while the line passes to its east. Between Antelope Creek and the Meridian Substation, a few houses are scattered over the east side of the ridge and 3-4 residences are within 1000 feet of the proposed transmission route.

Visibility of Line from Parks: This segment would be visible from two parks, Takelma and Roxy Anne Peak. The latter would only have distant views of the line, 1 1/2 to 2 1/2 miles away as it enters Meridian Substation.

The north end of the former park is located within 1000 feet of the proposed line, on the west bank of the Rogue. As is descends the

hillside to the west of the park, crosses a narrow pasture at the Rogue River, and enters the mature riparian woods on the east side of the river, this segment of the line would be clearly visible from many places within this park, including its river frontage and a small boat launch ramp. This park is presently undeveloped but is well-used by fishermen and as a place to launch boats for river floating. The existing riparian woods that cover much of the park help screen views to the north, but the northern end of the park, which is closest to the proposed alignment, is an open field with relatively unobstructed views.

BLM Management Class Designation: This section of line passess through areas designated as Class II, III, and IV. The Class II areas are defined by the viewshed of the Rogue River and include approximately 4.5 miles of the route as it crosses this valley and turns southeast over a low ridge. The Class III areas are defined by the viewshed of the Little Butte Creek Valley. The proposed line crosses this valley and Highway 140, which runs down its length, a short distance to the east of Brownsboro. Just under 4 miles of the route are located in this Class III management area. The remaining 18 to 19 miles of this section of the proposed line are located in Class IV areas.

APPENDIX C

FIGURE C-1: EXISTING VIEW OF TWIN OAKS-SPENCER CORRIDOR AND SOUTH HILLS FROM RIDGELINE TRAIL (DILLARD ROAD, EUGENE, LOOKING WEST).

FIGURE C-2: SIMULATED VIEW OF PREFERRED ALTERNATIVE IN TWIN OAKS-SPENCER CORRIDOR FROM RIDGELINE TRAIL.

FIGURE C-3: EXISTING VIEW OF SPENCER-DIXONVILLE CORRIDOR FROM STREET IN AN ADJACENT SUBDIVISION (COTTAGE GROVE AREA, LOOKING NORTH).

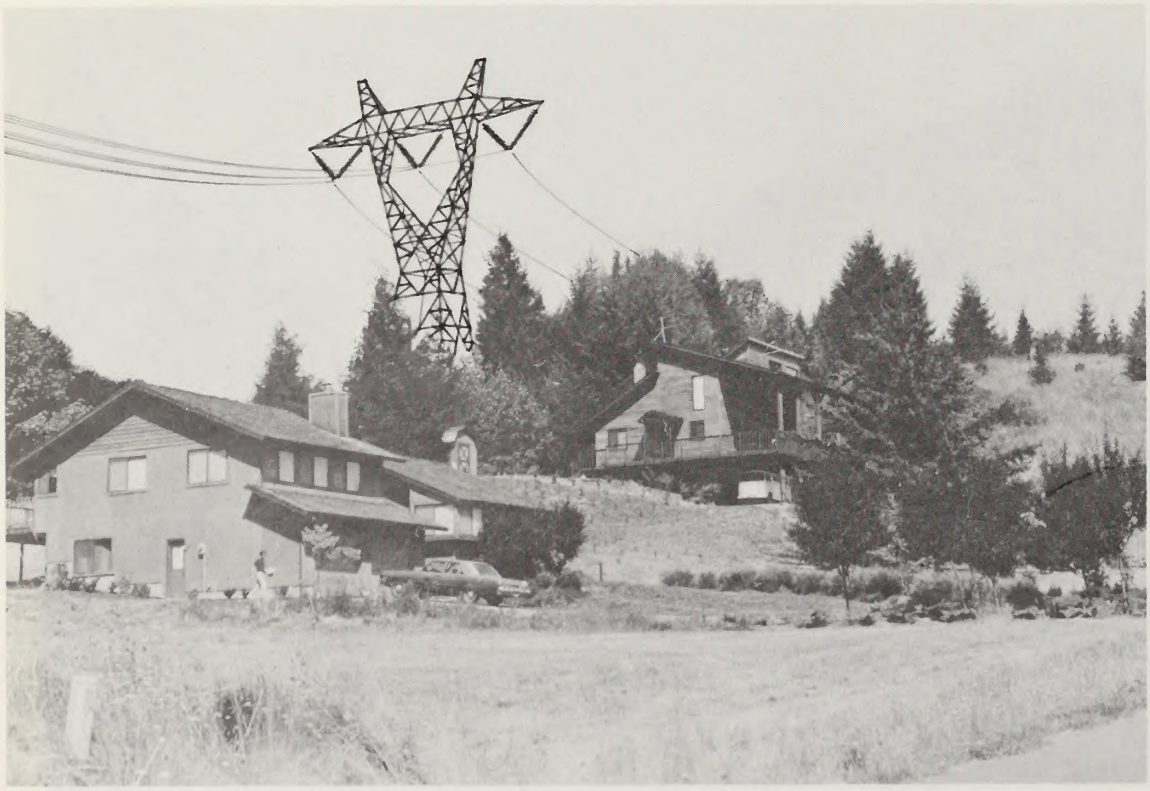


FIGURE C-4: SIMULATED VIEW OF PREFERRED ALTERNATIVE IN SPENCER-DIXONVILLE CORRIDOR FROM STREET IN AN ADJACENT SUBDIVISION.

FIGURE C-5: EXISTING VIEW OF TYPICAL FORESTED SECTION OF SPENCER-DIXONVILLE CORRIDOR (ELKHEAD, LOOKING SOUTH).

FIGURE C-6: SIMULATED VIEW OF PREFERRED ALTERNATIVE IN TYPICAL FORESTED SECTION OF SPENCER-DIXONVILLE CORRIDOR.

FIGURE C-7: EXISTING VIEW OF SPENCER-DIXONVILLE CORRIDOR ALONG NORTH UMPQUA HIGHWAY (LOOKING SOUTH TOWARD DIXONVILLE).

FIGURE C-8: SIMULATED VIEW OF PREFERRED ALTERNATIVE ALONG NORTH UMPQUA HIGHWAY (SINGLE CIRCUIT STEEL LATTICE STRUCTURES).

FIGURE C-9: SIMULATED VIEW OF ALTERNATIVE THREE ALONG NORTH UMPQUA HIGHWAY (DOUBLE CIRCUIT STEEL LATTICE STRUCTURES).

FIGURE C-10: SIMULATED VIEW OF REHABILITATED CORRIDOR ALONG NORTH UMPQUA HIGHWAY IF OPTION D IS ADOPTED.

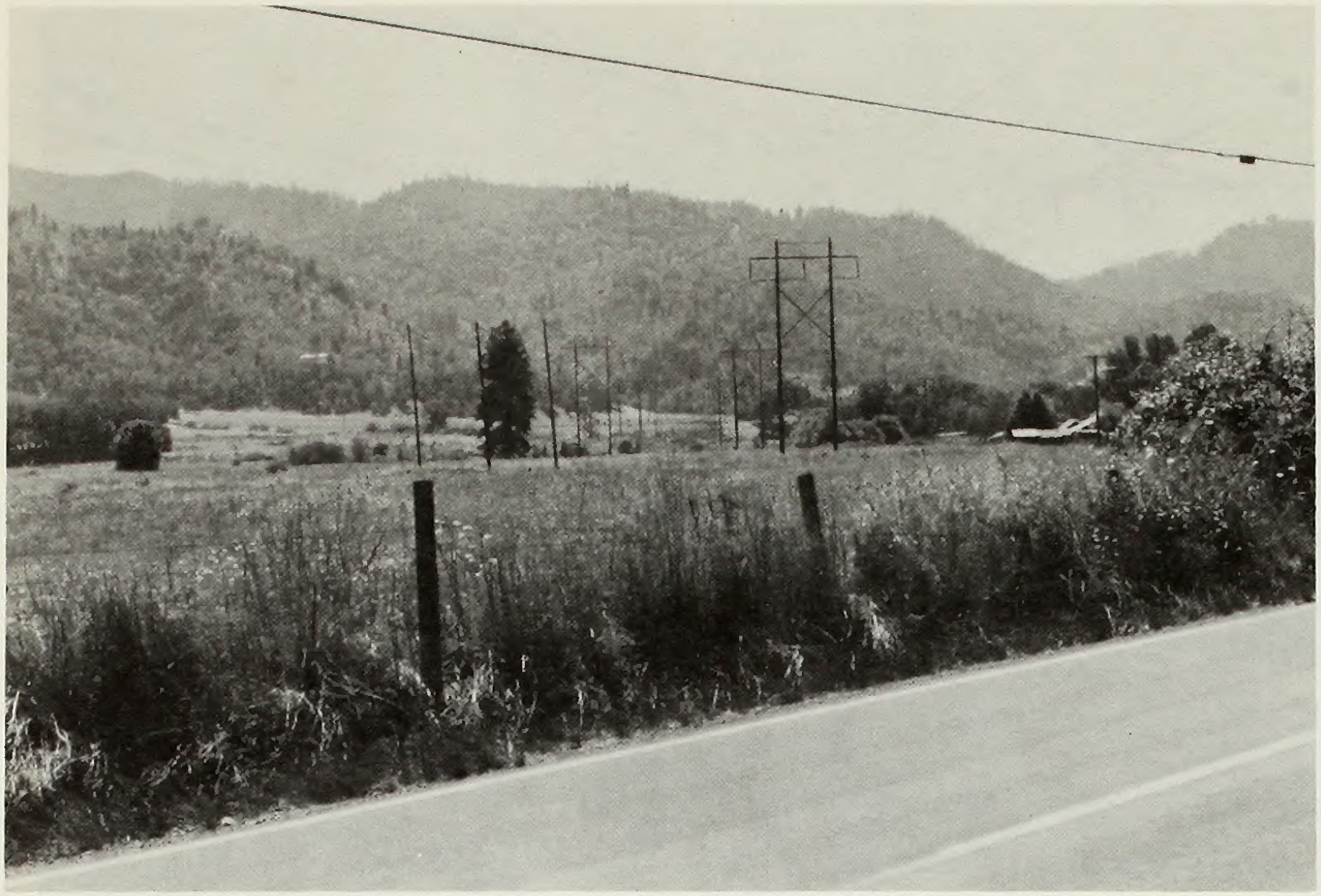


FIGURE C-11: EXISTING VIEW OF TYPICAL FARMLAND SECTION OF SPENCER-DIXONVILLE CORRIDOR (SOUTH UMPQUA VALLEY, LOOKING SOUTH).

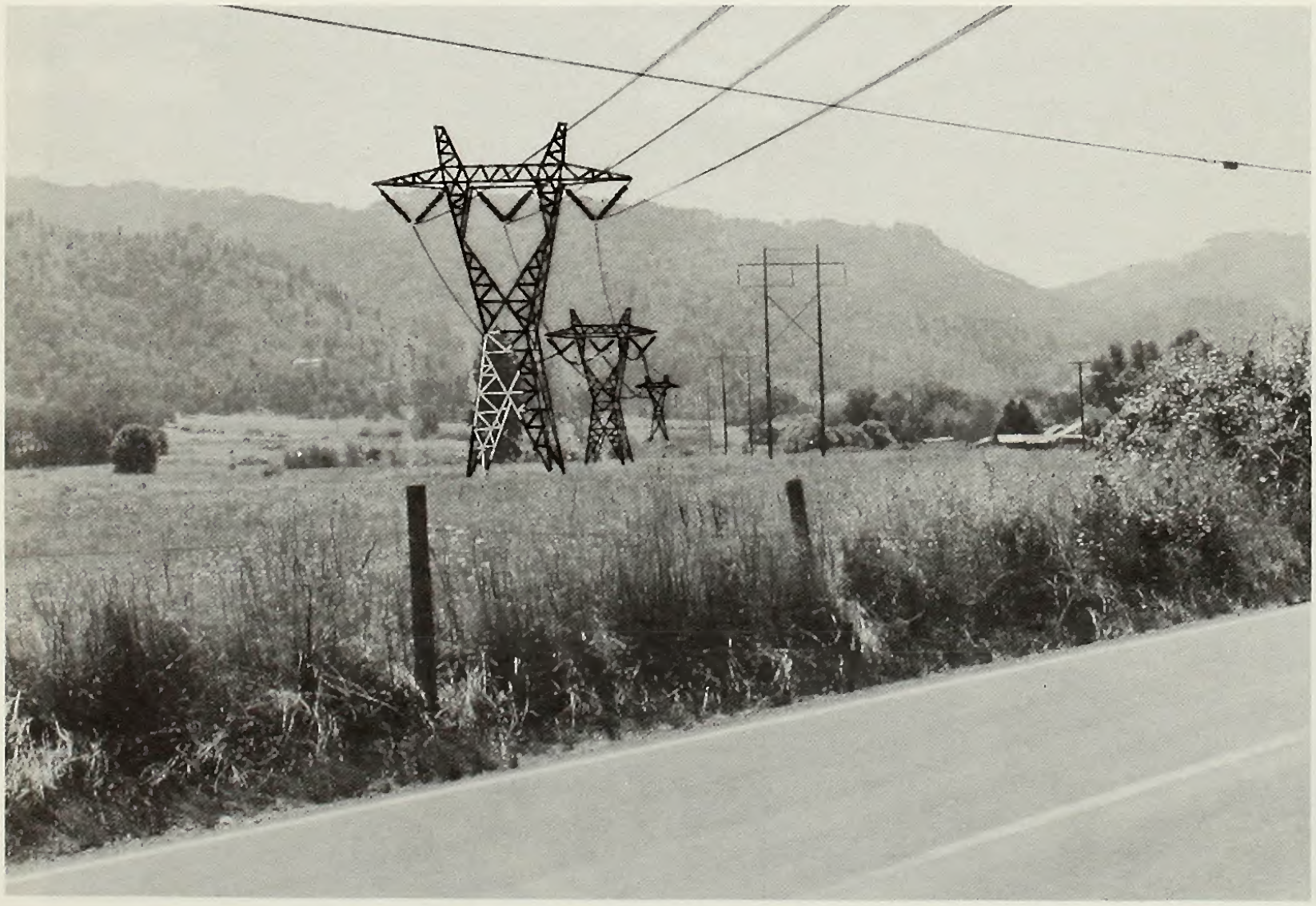


FIGURE C-12: SIMULATED VIEW OF PREFERRED ALTERNATIVE IN TYPICAL FARMLAND SECTION OF SPENCER-DIXONVILLE CORRIDOR.

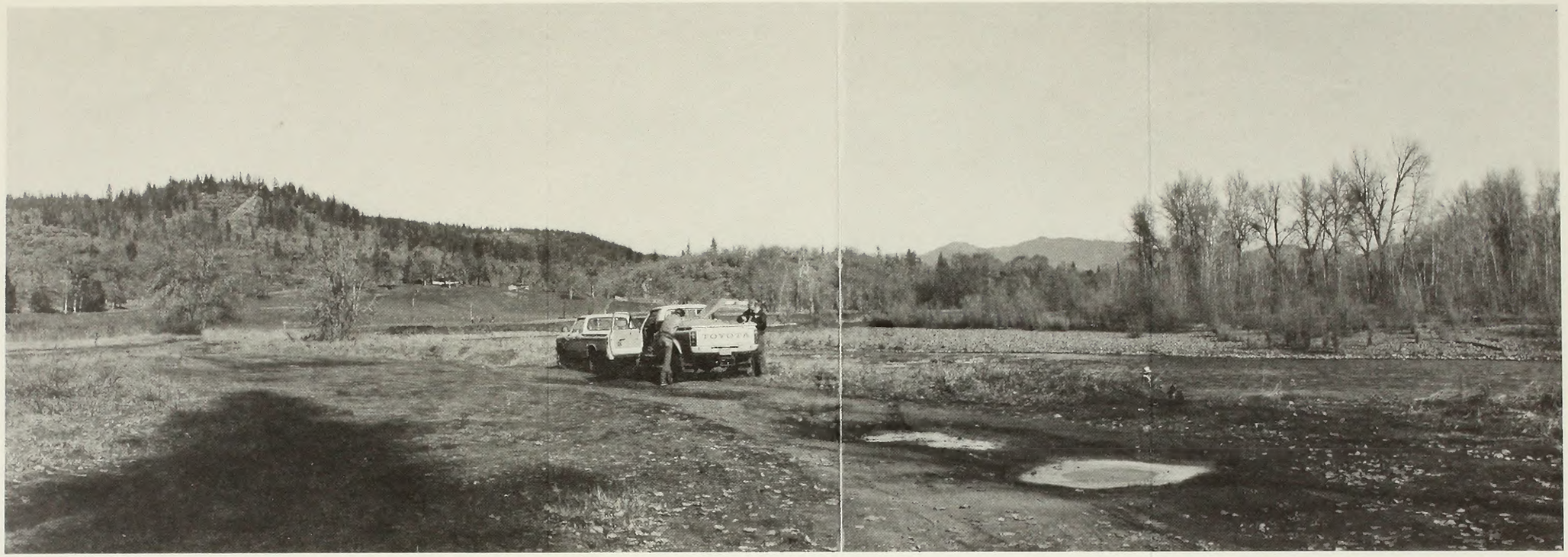


FIGURE C-13: EXISTING VIEW OF ROGUE RIVER NEAR SHADY COVE (PARKING AREA AT TAKELMA PARK, LOOKING NORTH).

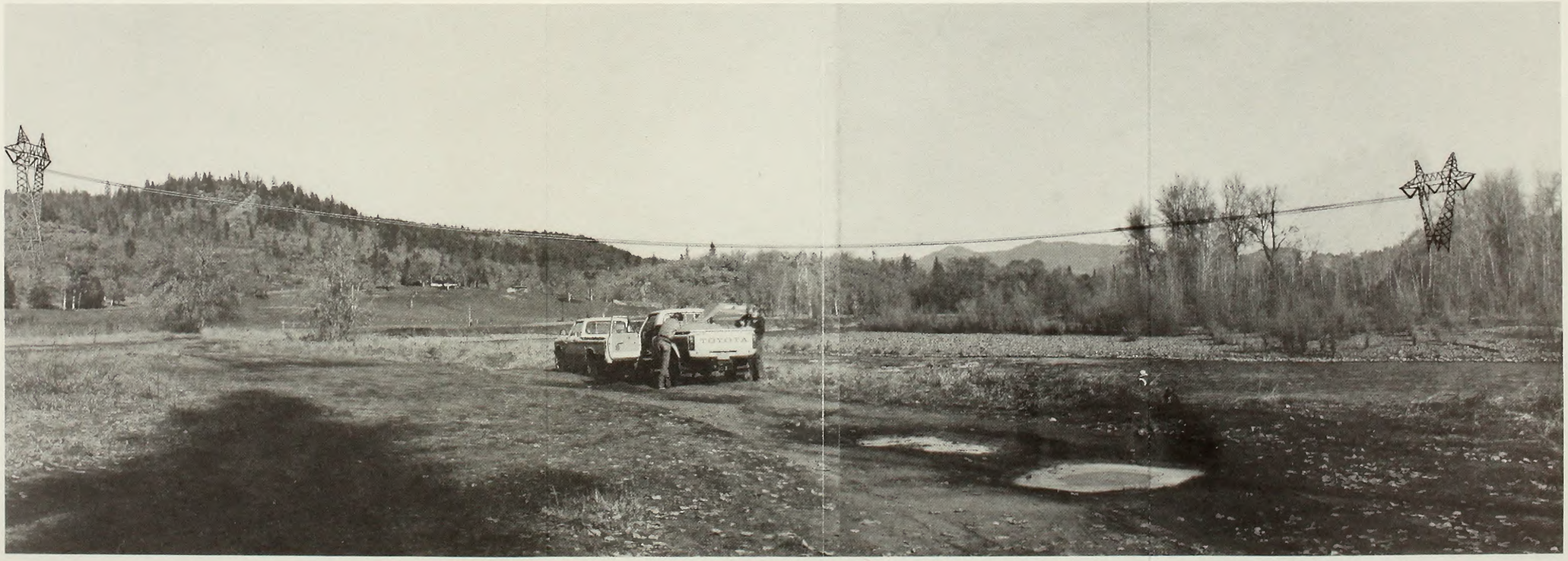


FIGURE C-14: SIMULATED VIEW OF PREFERRED ALTERNATIVE AT ROGUE RIVER CROSSING (SINGLE CIRCUIT STEEL LATTICE STRUCTURES). IN ACCORDANCE WITH A PLANTING PLAN TO BE NEGOTIATED WITH THE JACKSON PARKS AND RECREATION DEPARTMENT, TREES AND SHRUBS WOULD BE PLANTED TO HELP SCREEN THE LINE FROM RECREATION ACTIVITY AREAS.

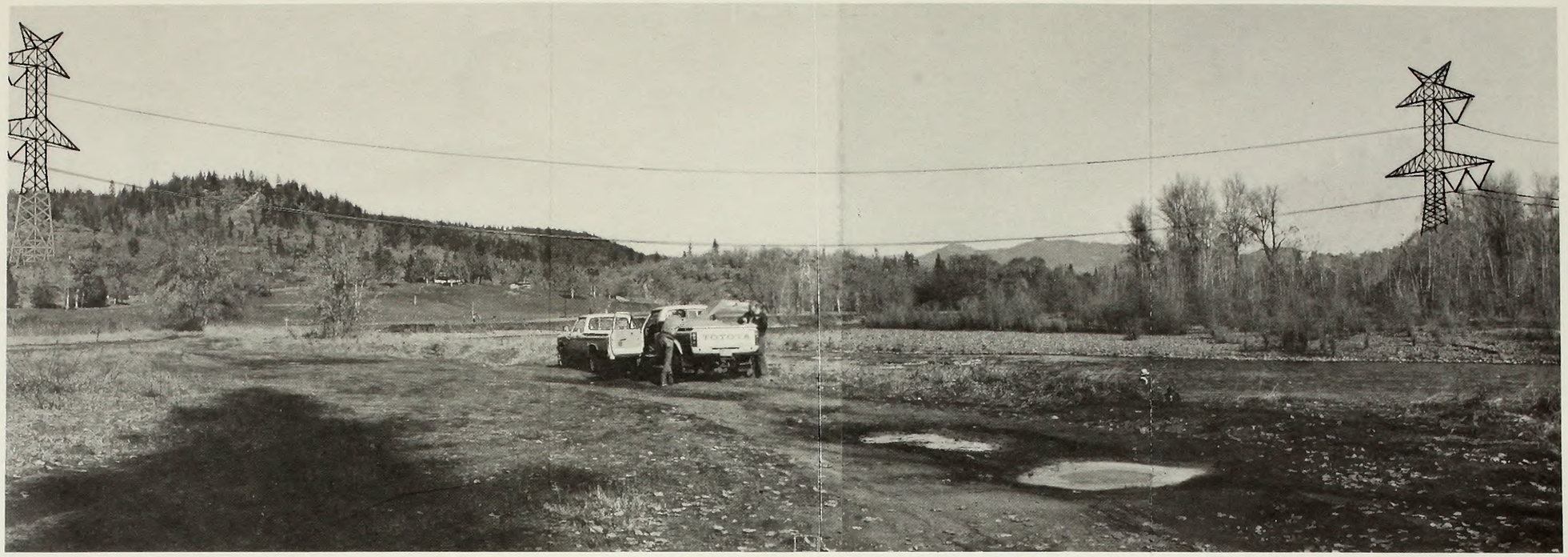


FIGURE C-15: SIMULATED VIEW OF PREFERRED ALTERNATIVE AT ROGUE RIVER CROSSING, ILLUSTRATING THE POSSIBLE USE OF TUBULAR STEEL STRUCTURES TO REDUCE VISUAL IMPACTS. IN ACCORDANCE WITH A PLANTING PLAN TO BE NEGOTIATED WITH THE JACKSON PARKS AND RECREATION DEPARTMENT, TREES AND SHRUBS WOULD BE PLANTED TO HELP SCREEN THE LINE FROM RECREATION ACTIVITY AREAS.

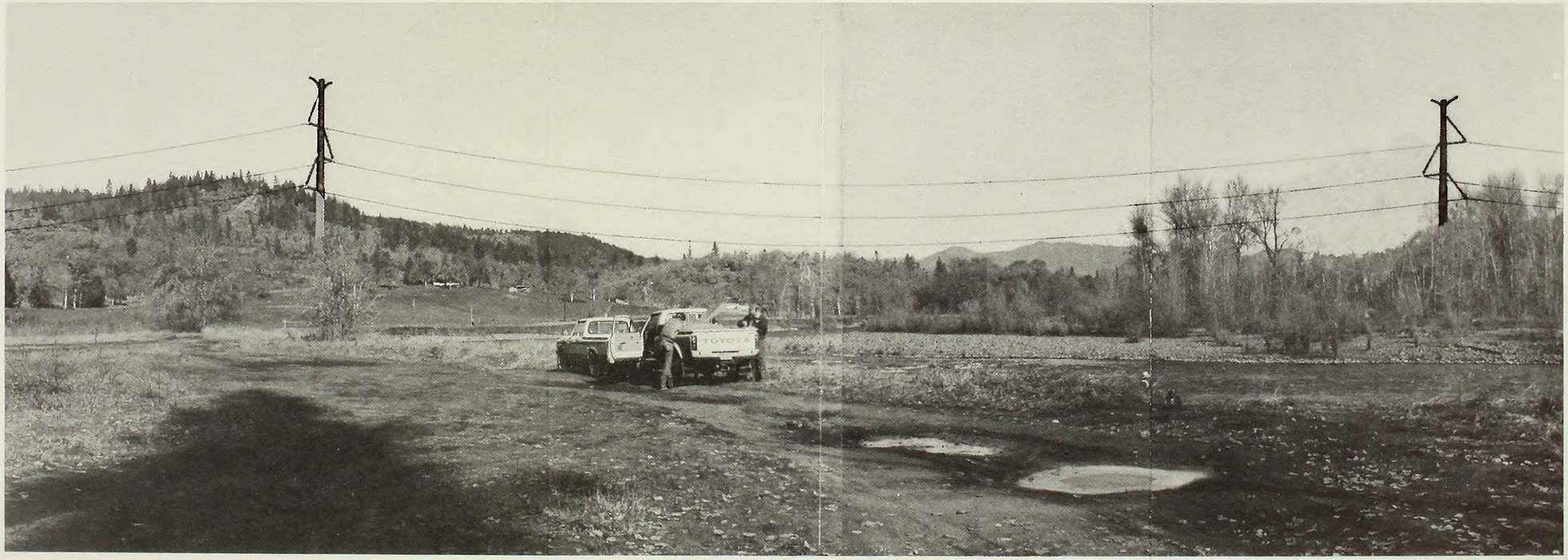


FIGURE C-16: SIMULATED VIEW OF ALTERNATIVE THREE AT ROGUE RIVER CROSSING (DOUBLE CIRCUIT STEEL LATTICE STRUCTURES). IN ACCORDANCE WITH A PLANTING PLAN TO BE NEGOTIATED WITH THE JACKSON PARKS AND RECREATION DEPARTMENT, TREES AND SHRUBS WOULD BE PLANTED TO HELP SCREEN THE LINE FROM RECREATION ACTIVITY AREAS.

FIGURE C-17: EXISTING VIEW OF CRATER LAKE HIGHWAY BETWEEN EAGLE POINT AND SHADY COVE (LOOKING NORTH).

FIGURE C-18: SIMULATED VIEW OF PREFERRED ALTERNATIVE AT CRATER LAKE HIGHWAY CROSSING.

FIGURE C-19: EXISTING VIEW OF SAMS VALLEY SECTION OF EXISTING CORRIDOR (SAMS VALLEY ROAD, LOOKING NORTH).

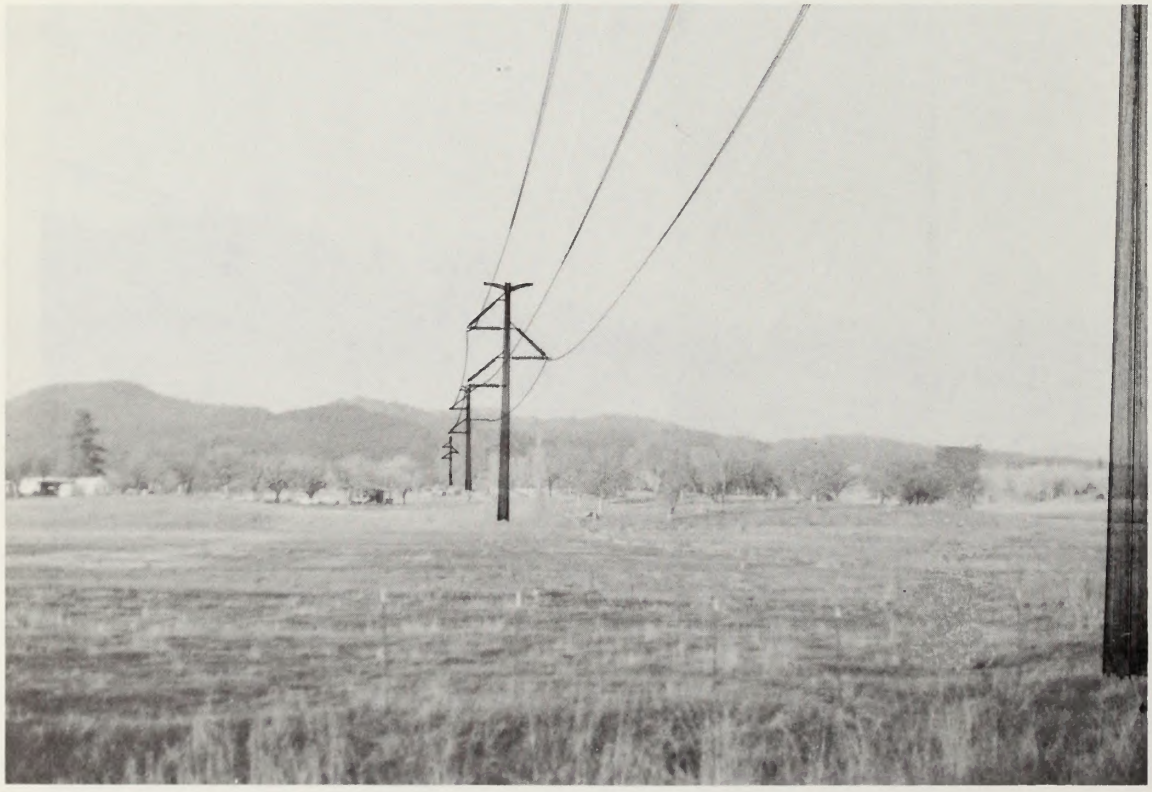


FIGURE C-20: SIMULATED VIEW OF OPTION I IN SAMS VALLEY SECTION OF EXISTING CORRICOR (SINGLE CIRCUIT TUBULAR STEEL STRUCTURES).

FIGURE C-21: SIMULATED VIEW OF OPTION M IN SAMS VALLEY SECTION OF EXISTING CORRIDOR (DOUBLE CIRCUIT STEEL LATTICE STRUCTURES).

FIGURE C-22: EXISTING VIEW OF WHITE CITY SECTION OF EXISTING CORRIDOR (JUNCTION OF ROUTE 140 AND CRATER LAKE HIGHWAY, LOOKING EAST).

FIGURE C-23: SIMULATED VIEW OF OPTIONS H AND I IN WHITE CITY SECTION OF EXISTING CORRIDOR (SINGLE CIRCUIT TUBULAR STEEL STRUCTURES).

FIGURE C-24: SIMULATED VIEW OF OPTIONS L AND M IN WHITE CITY SECTION OF EXISTING CORRIDOR (DOUBLE CIRCUIT STEEL LATTICE STRUCTURES).

APPENDIX D

MEMORANDUM OF UNDERSTANDING (MOU)

BETWEEN

UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION

STATE OF OREGON
OREGON DEPARTMENT OF ENERGY

PACIFIC POWER AND LIGHT COMPANY

FOR THE

ENVIRONMENTAL IMPACT STATEMENT PREPARATION
PERTAINING TO A PROPOSED ELECTRICAL TRANSMISSION LINE
FROM EUGENE TO MEDFORD, OREGON

I. Introduction

It has been mutually decided by the Bureau of Land Management (herein referred to as BLM), and Bonneville Power Administration (herein referred to as BPA), in consultation with the Director of the Oregon Department of Energy (herein referred to as State), that an Environmental Impact Statement (EIS) will be necessary prior to the grant of a right-of-way to Pacific Power and Light Company (herein referred to as PP&L) for a proposed 500 KV transmission line from Eugene to Medford, Oregon. The EIS is intended to fulfill the requirements of Federal laws by complying with the provisions of the National Environmental Policy Act of 1969 (NEPA) and other Federal environmental laws, executive orders, and policies. In addition, to the extent possible the EIS will be designed to fulfill the requirements of the State Energy Facility Siting Council as set forth in OAR Chapter 345, Division 80.

II. Definitions

A. "Process" means jointly the NEPA process and the State Energy facility siting process.

B. "PDEIS" means Preliminary Draft Environmental Impact Statement; "DEIS" means the Draft Environmental Impact Statement; "FEIS" means the Final Environmental Impact Statement.

C. "Primary Parties" means the lead federal agency (BLM), State, and PP&L. (40 CFR 1501.5) These parties will have the final responsibility to insure that the NEPA process is adequately performed. In addition, they will also be involved as cooperating parties as in D. below.

D. "Cooperating Parties" include the primary parties plus the cooperating federal agency (BPA) (40 CFR 1501.6). These parties will cooperate, coordinate, provide expertise, technical review, and consolidate procedures to establish efficiency in the Process.

E. "Scoping" means an early and open procedure for determining the alternatives to be addressed in the EIS; for identifying the significant issues related to the proposed action and alternatives to the proposed action; and to comply with the requirements of OAR-345-80-072.

III. Purpose

The purpose of this MOU is to establish an understanding among the BLM, BPA, State, and PP&L for the efficient completion of the Process. It will establish obligations to be met and procedures to be followed by the primary parties; and BPA as a cooperating party for completion of the Process. This MOU defines general and specific measures that will be undertaken by all parties for the fulfillment of mutual objectives and individual requirements. The goal of this MOU is to minimize Process completion time while maintaining the quality necessary to meet the requirements of applicable laws and regulations. Another goal is to reduce paperwork and delay by eliminating duplication.

IV. Obtaining a Contractor

A. BLM shall develop, in consultation with BPA, State, and PP&L, the evaluation criteria to be used for selecting an environmental contractor (herein referred to as Contractor). The evaluation criteria shall contain, but not be limited to, the following factors:

1. Expertise in the areas of environmental concern (water quality, biology, land use, visual resources, archaeology, socio-economics, threatened and endangered species, forestry, soils.)

2. Demonstrated ability to perform environmental analyses through experience or expertise.

3. Ability to produce thorough concise, readable, and informative documents.

4. Evidence of a good working knowledge of NEPA, Federal and State regulations and applicable local ordinances, and other statutory and administrative requirements.

5. Staff capacity to complete the EIS within 18 months of completion of the scoping process. Scoping is to be completed not later than 60 days from receipt of a site certificate application or a voluntary notice of intent to file a site certificate application with the State.

6. Demonstrated experience with completing environmental studies on transmission line projects.

B. BLM, State, BPA, and PP&L shall identify prospective EIS contractors who meet the evaluation criteria. Prospective contractors will be asked to submit technical proposals for preparation of the EIS, based upon specifications which shall be prepared by BLM in consultation with State, BPA, and PP&L.

C. BLM in consultation with the State shall evaluate the technical proposals submitted by the prospective EIS contractors with the use of BLM selection criteria. BLM shall have the sole responsibility for the final selection of the Contractor. The Contractor shall be separate, independent from, and not subcontracted by anyone preparing the engineering plans and construction designs. The Contractor shall not have any financial or economic interest in the planning, design, construction, or operation of the proposed project.

D. PP&L shall hire only the approved Contractor for the EIS preparation. The Contract shall be between PP&L and the Contractor. All costs incurred pursuant to the Contract shall be the sole responsibility of PP&L. No costs or expense borne by PP&L under the contract shall be deemed to be "administrative or other costs" subject to BLM cost reimbursement regulations under 43 CFR Subpart 2803.

E. The contract shall require that the Contractor shall execute a disclosure statement, prepared by BLM, specifying that it has no financial or other interest in the outcome of the project.

F. The contract shall provide that the Contractor shall agree to hold harmless and indemnify BLM with respect to any and all claims, demands, cause(s), of action, and liabilities which may arise from the Contractor's performance, purchases or services utilized in the preparation of the EIS.

V. General Obligations of the Primary Parties

A. Actively participate in all phases of the Process.

B. Establish a mutually acceptable time schedule for the Process.

C. Develop an acceptable time schedule for the review of significant parts of the EIS as it is being developed.

D. Attend regular and other meetings with appropriate Federal, State, regional, and local agencies, and concerned groups for the purpose of increasing communication and receiving comments on the proposed project and related environmental documents.

E. Ensure coordination of efforts and exchange of information between primary and cooperating parties.

F. In all instances involving questions as to the content or relevance of any material (including all issues, data, analyses, and conclusions) in the EIS, BLM shall make the final determination on the inclusion, deletion or revision of the material, and shall have the ultimate responsibility for assuring compliance with the requirements of NEPA.

G. PP&L recognizes the responsibility of BLM to comply with NEPA, to define the issues, to review, modify and issue the EIS. However, in executing this MOU, PP&L reserves the right to contest, in any administrative or judicial proceedings, the content and adequacy of the EIS; any decision concerning the issues in the EIS; or any other Federal or State requirement relating to the proposed project.

VI. General Obligations of Primary and Cooperating Parties

A. Actively participate in the Process by cooperating with all the parties of this memorandum.

B. Expedite the Process by consolidating meetings, mandatory processes, and documents whenever practicable.

C. Have their respective representatives attend regular meetings with the other parties to this memorandum. Attend other meetings when any particular party's attendance is necessary to provide issue clarification, expertise, or in response to a public demand.

D. Provide all general and specific information, within their respective purview, that will be needed to complete the Process.

VII. Procedures

A. The Primary parties will jointly develop a "preparation plan" in consultation with the Cooperating party. The preparation plan shall be approved by BLM prior to the preparation of the EIS. The preparation plan describes the significant issues to be addressed in the EIS and defines the organization, scheduling, and content of the EIS. The preparation plan will be used by the Contractor as an outline for EIS preparation along with CEQ Regulations, U.S. Department of the Interior Manuals, and BLM's current EIS guidelines. The approved preparation plan may be modified by BLM only in the event that there is a change in the proposal, new information surfaces, policy changes occur which affect project scope, or as a result of comment on the DEIS. BLM will inform parties in writing of all such modifications.

B. BLM and State will be responsible for conducting scoping meetings with the public, prior to the initiation of the Process. These meetings will be held to determine the areas of public and agency concern pertaining to the proposed project, and to guide the parties in scoping the EIS.

C. The Contractor shall have primary responsibility for writing or rewriting all sections, parts, or chapters of the EIS consistent with the overall time schedule developed in the preparation plan.

D. Generally, joint meetings between all primary parties shall be held to coordinate the EIS preparation. BPA will attend some of these meetings. BLM staff or PP&L may at times work directly with the Contractor without the participation of all parties, but all parties shall be informed of such meetings and given the opportunity to participate. All significant meetings or conversations will be summarized in writing for the benefit of all parties.

E. The Contractor will provide BLM and the other parties with opportunities to review, comment, and suggest changes in the PDEIS. The parties will provide comments in a timely manner. The Contractor shall incorporate these comments and changes into the sections, parts, or chapters of the PDEIS as required by BLM. Upon acceptance and approval of the PDEIS by BLM, BLM shall issue the DEIS to the public, and Federal, State, and local agencies for review and comment. Printing of the DEIS shall be the responsibility of the Contractor and BLM shall be responsible for its distribution.

F. Upon completion of the DEIS, BLM and State will be responsible for organizing and conducting any public hearings. BLM will be responsible for filing the DEIS with the Environmental Protection Agency (EPA). BLM will receive all comments on the DEIS resulting from the review and comment period. A public comment period of no less than 60 days, unless otherwise designated by appropriate authority, will be initiated when EPA publishes the "Notice of Availability" in the Federal Register.

G. After the close of the DEIS review and comment period, BLM will assess and consider comments submitted by the public, Federal, State, and local agencies and determine which will require response in the FEIS. BLM will determine any necessary modification of the text. The State will be responsible for reviewing and assessing all comments which relate to the requirements of OAR Chapter 345 Division 80, and will determine any necessary modifications of the text which relate directly to these requirements. These modifications shall be incorporated in the FEIS by the Contractor in a timely manner.

H. Upon revision of the text, which includes the responses to the comments on the DEIS, the Contractor will provide all parties an opportunity to review the FEIS. Upon acceptance and approval of the FEIS, by BLM, BLM shall authorize the release of the FEIS to the public, and federal, state, and local agencies. BLM will be responsible for filing the FEIS with the EPA. Printing of the FEIS shall be the responsibility of the Contractor and BLM shall be responsible for its distribution.

VIII. Termination

A. Any party to this MOU may terminate its interest in it after 30 days prior notice to the other parties. During the intervening 30 days the parties agree to actively attempt to resolve any outstanding disputes or disagreements.

B. If BLM concludes that the environmental documents do not meet Department of Interior and BLM EIS standards, it may terminate the agreement. In the event of termination of the agreement, BLM will initiate preparation of the EIS, based on the applicant's request, and consistent with BLM's manpower and budget limitations. The applicant will be required to submit adequate environmental information to BLM prior to preparation of the EIS.

IX. RESERVED RIGHTS

By entering into this agreement, PP&L does not waive its objections to the BLM right-of-way processing cost regulations under which PP&L would be required to reimburse BLM for the cost of preparing the EIS in lieu of bearing such costs directly as provided herein; and PP&L reserves its right to challenge said regulations and the authority of BLM to insist that PP&L agree to bear the costs of preparing the EIS as a condition precedent to BLM's commencing review of the subject Project Application.

X. Parties Concurrence

For the Bureau of Land Management

Paul M. Yeterick

Date: 1/30/81

Signed: _____
(Name)

Title: Associate State Director
(State Director)

For PP&L

Date: 2/03/81

Signed: D. E. Dorman
(Name)

Title: President

OR - 209

For the Bonneville Power Administration

Date: 2/6/81

Signed: Marvin J Clanger

Title: Asst. Administrator for Engineering
and Construction

For the State of Oregon, Department of Energy

Date: 2/4/81

Signed: Lynn Frank

Title: Director

GLOSSARY

Alignment - The specific, surveyed location or route of a utility line.

BLM Visual Resource Management Classes - Management Classes describe the different degrees of modification allowed to the basic elements of the landscape. Class designations are derived from an overlay technique that combines separate maps of scenic quality, sensitivity levels, and distance zones. The overlays are used to identify areas with similar combinations of factors. These areas are assigned to one of five Management Classes according to predetermined criteria. The resulting map of contiguous areas sharing the same VRM class is an important document for all Bureau land use planning decisions, and it is also used to assess the visual impact of proposed development. At the most restrictive end of the class scale, Class 1 does not allow contrasts due to management activities which would attract attention; this classification is applied to wilderness areas and similar situations. Visual contrasts also must not attract attention in Class 2 areas. In Class 3 areas, contrasts can be evident but should remain subordinate to the existing landscape. Contrasts in Class 4 areas can be a dominant element but should repeat the form, line, color, and texture of the existing landscape, while the Class 5 designation is applied to landscapes which have been extensively disturbed and need rehabilitiation.

Cable - A conductor with insulation, a stranded conductor with or without insulation and other coverings (single-conductor cable), or a combination of conductors insulated from one another (multiple-conductor cable). Underground and underwater cables typically are housed in oil or compressed gas.

Circuit - A conductor or system of conductors through which an electric current is intended to flow.

Cogeneration - The simultaneous production of electricity and process heat. The most common form of cogeneration uses water as the working fluid to produce high pressure steam in a combustion boiler which is expanded through a single or multi-stage extraction or non-extraction turbine to produce electricity. Extracted and/or exhaust steam is used to supply process heat.

Conductor - A material, usually in the form of a wire, cable, or bus bar, suitable for carrying an electric current.

Cooperating Agency - A unit of federal, state or local government which is cooperating in the environmental impact statement process for a specific action. For this project, the cooperating agencies are the Bureau of Land Management (BLM) of the U.S. Department of the Interior, the Bonneville Power Administration (BPA) of the U.S. Department of Energy, and the Oregon Department of Energy (ODOE).

Cooperating Party - Any organization, public or private, which is directly connected with and cooperating in the environmental impact statement process for a specific action. For this project, the cooperating parties are the three cooperating agencies (BLM, BPA and ODOE) plus Pacific Power and Light Company.

Corona - A luminous electrical discharge which appears around transmission line conductors when the air adjacent to the conductor is ionized (electrically charged) due to the applied potential exceeding a certain critical value. Corona can be seen as bluish tufts or streamers surrounding the conductor, usually accompanied by an audible hissing sound. Transmission line corona varies with atmospheric conditions, being more intense during wet weather.

Corridor - A linear strip of land which accommodates or is expected to accommodate a utility facility or all such facilities with similar orientation passing through a given land area. Its width can be variable and is normally measured in feet.

Easement - A right that has been acquired on another's land; in this EIS the right is to construct and operate a transmission line.

EFSC - The Oregon Energy Facility Siting Council. EFSC is an independent unit of Oregon State government which is responsible for reviewing applications for the construction and operation of major energy facilities to be located within Oregon. Site Certificates, which usually contain conditions or stipulations governing construction or operating practices, are granted for approved projects after an in-depth hearing and evaluation process.

Fee Simple - Absolute ownership of land with unrestricted rights of disposition.

Gauss - A unit used in measuring magnetic induction or magnetic flux density, equal to one line of magnetic flux per square centimeter. The magnetic field of the earth is approximately one-half gauss.

Grounded - Connected to earth or to some extended conducting body which serves to maintain ground potential and dissipate current conducted to it into the earth.

Insulated - Separated from other conducting surfaces by a dielectric substance or airspace permanently offering a high resistance to the passage of current and to disruptive discharge through the substance or space, up to the dielectric's rated capacity.

kV - Kilovolt (1,000 volts).

Line Loss - The power dissipated in a transmission line expressed in watts; conductor resistance and other factors lead to power being lost in transmission between one point and another.

Load - The amount of electric energy consumed by a set of users.

Load Managment - Programs or methods used by an electric utility to shift electric energy consumption to off-peak hours and to reduce peak demand.

Load Shedding - A method whereby loads in isolated areas are dropped by automatic relays to provide protection for the bulk power system. This could occur when generation is insufficient to meet load or transmission lines are in danger of overload.

Magnetic field - A region of space in which there is an appreciable magnetic force. Near transmission lines, a magnetic field is created by the flow of current in the circuit.

Nonspecular - Nonreflective. A nonspecular surface (for example, an airblast-abraded conductor) does not shine.

Pacific Northwest - Southwest AC Intertie - A series of alternating current 500 kV transmission lines which are interconnected so as to provide a high voltage transmission link between the Pacific Northwest (Oregon, Washington, Idaho, and Montana) with the Pacific Southwest (California, Arizona, and Nevada). In general, most power is transmitted from the Northwest to the Southwest during periods of high runoff in the late spring and early summer, although power can be transmitted in either direction when conditions warrant it.

Particulate - Very small particles.

Puller - Usually a trailer-mounted rig with a donkey engine and a number of drums to pull the conductor.

Redundancy - In terms of reliability, the provision in a system of more elements and/or components than needed to perform a function even when some elements and/or components fail. In a transmission system, redundancy may simply mean the availability of more lines than necessary for operation with all system components in service.

Right-of-way - (appreviated: ROW; plural: rights-of-way) - an accurately located strip of land with defined width, point of beginning and point of ending. The area within which the user has authority to conduct the operations approved or granted by the land owner in an authorizing document such as a permit, easement, lease, license, memorandum of understanding, etc.

Riparian - Of, adjacent to, or living on the bank of a river, stream, lake or pond. In this document, riparian vegetation does not include wetland vegetation. Riparian vegetation crossed by the alternate routes consists almost entirely of riparian tree- or shrub-dominated areas bordering streams.

Span length - The horizontal distance between two adjacent supporting points of a conductor.

Tap - To tie a substation into an existing line by simply running a new single circuit from the substation to the existing line and tying into it; tapping feeds only a portion of the power carried on the line to the substation.

Third-Party Contractor - An independent firm contracted by one agency to perform work related to a proposed action of another organization; due to the financial and contractual arrangements governing such relationships, the third-party contractor has no financial or other interest in the decision to be reached on the project. Envirosphere Company, a division of Ebasco Services, Incorporated (which is a wholly owned subsidiary of the Enserch Corporation), is a third-party contractor for this EIS. Pacific Power and Light Company, the main project proponent, funds the work of Envirosphere Company although the work is performed under the control and direction of the BLM.

Vernal Pool - A surface collection of water, similar to a seep, generally occurring during the spring months.

Voltage - The effective root-mean-square (rms) potential difference between any two conductors or between a conductor and ground. Voltages are expressed in nominal values. The nominal voltage of a system or circuit is the value assigned to a system or circuit of a given voltage class for the purpose of convenient designation. The operating voltage of the system may vary above or below this value.

Wetland - Those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands crossed by the alternate routes consist of the open water, sand and gravel bar areas, banks of streams and a sedge dominated meadow adjacent to a small reservoir just south of the North Umpqua River crossing.

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INDEX